NEW-YORK FARMER,

AND

AMERICAN GARDENER'S MAGAZINE.

VOL. IX.] PUBLISHED MONTHLY, AT NO. 132 NASSAU STREET, NEW-YORK, AT THREE DOLLARS A-YEAR, IN ADVANCE. [No. 6.

D. K. MINOR, PROPRIETOR.] FOR JUNE, 1836. [NEW SERIES—VOL. IV.

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STATE HISTORICAL SOCIETY
816 STATE STREET
MADISON, WISCONSIN 53706

☞ *This number of the New-York Farmer consists of two sheets—the postage therefore is three cents for any distance under, and five for any distance over, one hundred miles.*

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NEW-YORK FARMER.

JUNE 1, 1836.

"BURLINGTON, N. J., WEEDING HOE."—We are indebted to Mr. Thomas Collins, of Burlington, N. J., for specimens of the above named hoe. To us they appear well calculated to answer their purpose; and we shall be pleased to exhibit them at all times to those who may desire to provide themselves with similar utensils of the very best kind.

We give the description in his own language.

Mr. T. Collins, takes the libery of presenting to Mr. D. K. Minor, a set of "Burlington Weeding Hoes," and recommends the kind, from several years experience, as the best he has seen. Their principal use is for destroying weeds while small: in the hands of an experienced gardner, they make great despatch. Narrow sawblades, of the best quality as to temper, should be used; and the holes for rivets should be punched through the sawplate *without heating*, in order that the temper may not be injured.—The thinnest sawbaldes are to be preferred, as they can never be very dull, and may the sooner be sharpened. Half worn "*bucksaws*" will answer for this purpose.

Burlington, July 4th, 1836.

Extract of a letter dated Columbia Pa. 18th June 1836.

As to the crops, you have probably received accounts from different parts of the country. In this county (Lancaster Pa.) we shall not harvest one eighth of a crop of wheat throughout the county, by the Fly attacking it in the fall, and at two different times this spring. We have not had so poor a prospect within the recollection of the oldest inhabitants. Some thirty years back, they say the Fly was bad in some fields, but this spring it is much more general. Rye has been injured very much by the long continued spell of wet weather, being in flower and much of it lodged and now rotted; corn much cut off by the cutworm and planted twice, and some the third time not all up yet, which will probably not ripen, many fields however, have escaped and look well. Oats, Barley and Grass, look very favorable.

Respectfully yours, &c.

J. B.

The Elms, Throgs Neck, June, 1836.

To the Editor of the New York Farmer.

SIR—If you think the following statement of the produce of a Cow worth inserting in your valuable Magazine, you can do it.

The cow is of the short horn Durham breed, a twin, her dam having had twins three times in four years, she is a bay, her sister pure white, now in possession of my neighbor Mrs. Post. My cow calved on the 16th March, her calf remained from her 19 days, raised on the skim milk, until my other cow came in on the 20th April. The produce of butter was in that time, say 35 days, 54½ lbs., and two butchers, although not sold to kill, pronounced her the best and heaviest calf they had seen that season. I will only observe, I keep but two cows and they are kept and feed in the yard.

Yours respectfully,

THOS. ASH.

The above remarkable account of the produce of a short horn cow is furnished us by Mr. Ash of Westchester county. There are few such, either as a breeder or a milker.

CASHAMERE GOATS.—We copy from the cover of the May number of the Farmer, the short notice in relation to this beautiful animal. We expected to have had an engraving and more full account of the animal for this number.

From the May No. of the New-York Farmer.

CASHMERE GOATS.—We were invited, a few days since, by Mr. J. DONALDSON KINNEAR, of Albany, to view a Cashmere Goat. Mr. Kinnear, through the aid of relatives in France, purchased a pair of these beautiful and rare animals, from a geatleman who owns the only flock in France; and they were brought from Paris to Havre in the Diligence, and there put on board of one of the packets, but from some cause, the voyage was too much for the buck, which died, as well as the young kid, which was added to the family on the voyage. The doe, however, survived; and although very lean, is a beautiful animal; being, as we were informed, the *first ever imported into this country*, will, we hope, be the first of *numerous flocks* which shall in a few years cover our hills; and we trust that Mr. Kinnear may soon replace his loss, and be successful, in rearing a flock which may be profitable. Why may we not, in a few years, manufacture Cashmere shawls, as well as silk? We MAY—and shall do it—and compete with the foreign manufacture in this as in every thing else we undertake.

THE HARLEIAN DAIRY—No. I.

BY H. C.

Milk, next to bread, is undoubtedly one of the most general and important articles of human diet. None is more universally salutary, and none more nutritious. To children it is next to indispensable; aged persons who are accustomed to it, find it extremely conducive to their comfort; and return to its use with even a stronger relish than they had for it in childhood. It is an important condiment with much of our food; and it is capable of being used in almost countless variety of delicious and nutritious forms.

Of the various animals, whose milk is employed for human food, the cow, both in respect to quality and quantity, is most generally preferred. Goats', asses', and mares' milk are used; but for convenience, nutritiousness, and quantity, the cow is above all others to be chosen; and as far as food is concerned, may be considered among the greatest blessings which Divine Providence has bestowed upon mankind. As matter of diet, there is nothing which in proportion to its weight contains so much nutriment; and as a beverage, to a simple and unadulterated taste none can be more grateful. In the country, where it can be had pure and in abundance, it ought to constitute the great article of food for children and young persons; and the miserable and pernicious and perfectly innutritious substitutes of tea and coffee ought to be kept entirely out of their reach. In cities, however, pure milk is almost as difficult to be procured as pure water. In New York city, for example, the milk is first deteriorated, if we may be allowed so to state, in the cow's udder;—that is, where cows are fed upon distillers' swill with scarcely any meal, and with barely hay enough to form a cud, the milk produced is of a very inferior quality; besides, with a large proportion of the milk-dealers, though not with all, it undergoes the ruleable and established dilution of one quart of water to four of milk; in addition to this, if it goes into the hands of the grocers, as in general they are too *modest* and *humane* to sell any thing like *strong* drink, it commonly undergoes another application from the town-pump. Indeed, we state upon the best information, that there are grocers in the city, who, without any aid from the cow, or at least the slightest possible, have offered the milk-men, when the supplies of the milk-men for their customers fall short, to furnish them from their own (the grocers')

resources, what they may need to make their supply sufficient: that is, they literally manufacture the milk, as we sometimes say, "out of the whole cloth." The process, we understand, is this: to take some Indian meal of the white gourd-seed variety, and pass some scalding water through it; and this water dashed with a slight touch of milk, as Bloomfield calls it, "three times skimmed sky-blue," *can be afforded* at about five cents per quart; and at this rate is actually vended to the poor forlorn wretches, who want their cent or their two cents' worth for their tea and coffee. Now whether this be or be not a real yankee trick we shall not venture to surmise, but the ingenuity of its performance belongs to the veritable city of Manhattan. It is however all of a piece with many of the London tricks, which London cream is readily manufactured out of flour or magnesia, and milk to a consistence to suit the most fastidious. The adulterations of human food, however, where it is susceptible of being adulterated to a profit, are most obvious and enormous, and it would be quite fortunate if all of them were as innocent as the above.

The adulterations of milk, the price obtained for it, and the frauds practised in its disposal, induced William Harley of Glasgow, an active and enterprising citizen, some few years since, to form a milk establishment of considerable extent in the neighborhood of that city, for the supply of the market with this article in a pure and cleanly condition; and indeed, as far as it depended on human skill, of the very best quality. This dairy attracted very extraordinary attention from its novel and convenient arrangements, and the admirable manner in which the whole business was conducted It was visited as a matter of great curiosity by vast numbers of people, including many of the nobility and several of the princes and sovereigns of Europe; and as far as concerned the great object of furnishing an article of the best quality, and in the best condition, and with scarcely the possibility of adulteration until it left the hands of the vender, its purposes were admirably accomplished. It was not, we believe, equally profitable to the enterprising proprietor; the establishment was evidently conducted upon two expensive a scale to be expected to yield large returns. Harley has given a detailed account of the establishment, and of his own experience in the dairy business. It is a book containing much valuable information; and I have thought it would be both interesting and useful to the readers of the New York Farmer to have an account of it.

I shall not undertake a particular description of the building. The largest amount of cows kept at it at any one time was two hundred and sixty. The largest building contained stalls for one hundred cows. There was an appendage which deserves particular attention. At the end of the house was a large tank or reservoir as a depository for the cows' urine; it was fifty feet long, six feet wide, and six deep. The surface of the tank was on a level with the bottom of the cellar; it was covered with flat brick work, arched, leaving a space in the centre of the arch four feet square, for taking out the sediment. This aperture was surrounded by a wall, sufficiently high to prevent the dung from getting into the tank. This was an admirable provision for the saving of a substance of extraordinary value to the farmer, where he can avail himself of it. In Flanders it is saved with the greatest care, and mixed with rape or oil cake as the very best manure which they can apply to their lands. The only provision in this country on any extensive scale for saving it, which we have met with, was at the farm of Robert H. Smith, Esq. near Baltimore where a hundred cows were kept; a large reservoir was made in the yard, and gutters and covered drains were formed for the purpose of conveying the urine to this deposit; from which it was taken, and by a machine like that used for sprinkling the streets of cities, was distributed over the fields. The value of this manure is very great, and is not yet appreciated among us. No provision is made for saving it in any of the cow-houses of New York city, where some of the milk establishments exceed three hundred cows, and the feed to which they are accustomed produces the most abundant secretions of urine.

The grand building in the Harleian dairy, which had stalls for one hundred cows, was ninety-four feet long by sixty-three feet wide, within the walls. It had vaults under the whole, divided for the purpose of receiving the dung, of storing potatoes and roots, and for an apartment for keeping the cows that were dry and prepared for fattening. This apartment being quiet, and having little light, was deemed better adapted for carrying on the process of fattening than the other cow-houses; darkness and quiet greatly contributing to assist the progress, and making the cattle much sooner fit for slaughtering.

It was deemed highly important, and it was so contrived, that the house should be perfectly ventilated, and at the same time preserve an equal temperature—both which points were conducive to their milking and fattening; and the cattle were in this way kept in the best health and condition. The heat was generally kept at the temperature from 60 to 64 degrees of Fahrenheit's scale; and as the walls were plastered carefully, the cattle never experienced any injury from cold even in winter. A direct current of cold air, suddenly admitted, was found to be exceedingly injurious, and much pains was taken to avoid this.

The floor on which the cows stood was raised six inches above the passages; this not only showed the cows to advantage, but kept them dry and clean; and two and a half feet of the floor next to the trough was made of composition similar to what is commonly used in making barn floors; because the principal weight of the cows being upon their fore feet, and as in lying down the whole weight is upon their knees, it was obviously desirable to have that part of the stall as smooth and soft as possible. In all cow-houses, he remarks in continuation, the front part of the stall should be rather lower than the back part, since it would enable the cattle to lie easier; and besides this they would not be apt to slip their calf.

The ordinary method of fastening cattle in cow houses, is, to fix the neck of the animal between two stakes, which are commonly called stanchions. This mode is greatly disapproved by Harley, as it prevents the cattle licking themselves. The indulgence of this propensity he deems of much importance to the health of the animal, as it contributes like currying to promote a free perspiration, and increase the circulation of the blood; and thus conduces to their general health. He deems the free ventilation of the cow-houses of great importance; as otherwise the milk is often tainted by the bad odour of the buildings, as has been experienced even in passing it from the cow to the pitcher. As the dung was preserved from the wind and weather, it was considered worth twenty-five per cent. more than that which had been so exposed; and the urine was sold by the butt of about four hundred gallons.

The milk-house in its construction was particularly favored by the nature of the ground. It was long, high, and wide, and every possible means employed to have it cool and airy. The floor was paved with stone of the best quality. The milk dishes were placed upon the pavement on each side, leaving a space for a passage in the center; they were then filled with new milk, a plug was put into the cesspool; the stop-cock at the end was then turned, and the water allowed to flow until it covered the floor where the milk vessels were placed. The house was in this way kept cool, and the floor was regularly washed and rubbed with a dry cloth; and this, with a complete ventilation of the premises, kept the atmosphere very pure. The churning-house at Willowbank was ventilated and lighted by windows in the north side, and in the roof, covered with fine-wire grating. The milk office contained the large tubs for receiving the milk from the cows, from which it was measured out to the distributors. The manager had a house within the premises; the dairy-maid and one or two of the servants were accommodated there, it being necessary they should be on the spot night and day. Two apartments, one for the men and another for the women, were alloted, for the purpose of keeping their clothes; and that they might the more conveniently change them, before going out to deliver the milk; numerous clothes and

towel pins were fixed in the wall; and the rule to be implicitly obeyed by the servants was, that their hair was to be combed, their hands and face washed, and their dress to be neat and clean. Cleanliness, indeed, was always regarded as essentially necessary in this and every part of the establishment.

Milk is often either spoiled or deteriorated from the vessels not being properly cleansed. If milk is put into a place not well ventilated, or where other articles are kept, it will affect its flavor. This was often ascertained by some of the Willowbank customers, having their milk deteriorated, after remaining a short time with them, whilst it retained its rich flavor with others, who received it from the same pitcher at the same time.

There was a steam engine connected with the establishment, for various purposes: for heating water, for steaming provender, for propelling a threshing machine, a turnip and potato slicer, a hay and straw cutter, a grain bruiser or grinder, and a churning apparatus. The steam engine was one of about six horse power; but the boiler could have supplied an engine of twelve horse power. Coiled within the boiler was a leaden pipe, 150 feet long, and 2 inches in diameter; cold water was admitted at one end of this pipe by a stop cock, and the water was heated in passing through the boiler. Branches were taken from the other end of the pipe to the scullery, hot-baths, bakery, &c.

A steam pipe from the boiler was introduced into the steaming vessels for preparing food for the cattle, so that one fire of dross was sufficient for the whole establishment. The milk office and other apartments were also heated by hot water vessels. The steaming vessels were made of plate iron; the one for cows was ten feet long, four wide, and four and a half deep, with a semi-circular top hinged on one side and lifted by weights and pulleys; the lid was formed round the edges to prevent the steam from escaping. The cut provender, consisting of turnips, hay, &c., was put into this vessel in layers, well salted, and with a sufficient quantity of water. The vessel had a false bottom, perforated with holes, under which the steam was admitted. The potatoes were generally steamed by themselves in a vessel, and the fresh water, which was deemed unwholesome, drawn off. The potatoes, turnips &c. for the horses were washed clean; those for the cows were not washed, but put in by themselves; and when at the boiling point, the first water was let off; they were then mixed with turnips, hay, &c. in alternate layers, and sprinkled plentifully with salt.

Every milker had a strong tin vessel without a lid, which held about forty quarts. As each cow was milked, the milk was emptied into this vessel, which was placed in the transverse passage to be out of the reach of any thing that might fall into it, if it were placed in the passage behind the cows. When the vessel was filled it was carried to the milk-office, and emptied into the receiving tub, and the quantity marked upon a slate by the clerk or person in attendance; this task was repeated till all the cows were milked, and the whole transferred to the milk-book.

Each distributor had a pair of milk-pitchers, with lids to fit tight, which contained from twelve to eighteen quarts. These were locked and secured to prevent adulteration. Every possible pains was taken to preserve the milk free from any extraneous substance, and to deliver it pure to the customers.

THE HARLEIAN DAIRY—No. II.

BY H. C.

We proceed now in our account of the Glasgow Dairy, or milk establishment, quoting freely from the accounts given of it by Harley himself.

As there would occasionally be a surplus of milk, what was returned or not wanted for the customers, was set for cream. Most of the vessels for raising cream were made of oak, and were well washed, boiled, and rensed every time they were emptied. To prevent the bottoms from twisting or warping by boiling there was a second bottom taansverse; and the two bottoms were pinned together as in ship building. They were twenty seven inches in diameter and five inches deep.

We believe that wooden vessels are after all, much to be preferred for the keeping of milk. Metallic dishes of every kind are liable to be corroded by the acid of the milk, producing in some cases, a compound absolutely poisonous; and earthen vessels, which are glazed with lead, are liable to the same objection. Glass or china would be too expensive and not procurable; wooden vessels may require rather more care in order to keep them clean, but there is no impracticability in the case, and otherwise they are liable to no objection.

The vessels for holding milk and cream for souring, stood in the churning house or an adjoining apartment; the milk or cream stood in them until it was thick and sour, without which it would not churn to advantage. There was a vessel for each different milking, as it was found injurious to mix the milk; and if milk and cream were put in at different times, it was always well stirred. It was found however, that the preferable way, was to keep every quantity distinct and to allow it to become sour by itself.

Large stands were filled at the wash trough and carried to the head passages at feeding time; from these the feeders gave a small additional quantity of food to the cows as they required it; but great care was taken not to give too much to any. Some distiller's wash, or waters or a mixture of both, was then given them to drink; and when the animals were satisfied the vessels were removed. There was also a feeding vessel or tub for each cow, which was made of oak twenty inches in diameter, and ten inches deep.

The byremen were each supplied with a rake, a broom, and a forked stick for gathering up the dry litter to the fore feet of the cows; these were preferred to iron, which sometime injured the animals feet. Each milker had a coarse towel, a washing cloth, a currycomb, and a hair cloth.

Early in the season, part of the Proprietors farm and some small fields contiguous to the cow-house, were sown with barley and grass seeds; these were watered with cow urine by means of an engine upon the principle of a fire engine. There were also used for that purpose hand barrows with broad wheels, upon which barrels were placed filled with urine. Under the barrels were placed conductors about eight feet long, perforated with small holes; these barrels were easily wheeled along the rich soft ground which would have been destroyed by horses and carts The urine was carted to the fields in large casks, from which it was carried in stands resting on spokes, to the engine and barrows.

The grass of the fields thus irrigated was cut five or six times a year; and though not very long in the blade, there was always great weight of produce. Indeed it was so thick and rich that it would have rotted unless cut often.

The first cutting generally commenced about the middle of April and was continued once a month. The grass was cut during the day, when the weather was wet or moist; but when it was dry it was cut late at night or early in the morning, and the field irrigated immediately after being cut; the process was sometimes performed during the night. Sir John Sinclair visited one of these fields, which had been cut sixteen times in three years.

There was a public washing house adjoining the dairy, all the soap suds from which was carried into a well or tank, and applied in the same way as urine; and sometimes the two liquids were mixed together, or if the weather was very dry the urine was diluted with water. I private families were to preserve their soap suds, and the urine of their cow if

they have one, it would be found of essential benefit in manuring the garden.

The provender commonly used at Willowbank, consisted of hay, straw, grass and green barley; also Swedish turnips and the different varieties of Aberdeen yellow, red tops, &c. also mangle wurtzel, carrots, cabbages, ground oil cake, bruised beans, and other grains.

Mangel wurtzel was recommended to the proprietor as provender for his cows upon economical grounds. He accordingly made trial of it in 1814, but the result did not answer his expectation. It was not productive as a crop except in particular soils, such for instance as suited carrots. Besides it did not stand the frost, and it was found necessary to be taken up in the fall, the tops cut off, and the roots used during the winter, mixed with other provender. A trial was made with this root and Swedish turnips; a coresponding weight of each was given to two lots of cows of equal numbers, and great attention was paid to the quantity and quality of the milk produced, and the improvement in the condition of the cattle. In these respects however, there was found to be little or no variation. The quantity and quality of the milk, and the improvement of the cattle were much the same; but as the mangel wurtzel did not stand the frost, and moreover required a deep soil in the cultivation, the Swedish turnips were necessarily preferred.

About this time, Mr. Coke of Norfolk lost some cows, and other agriculturists had their cattle much injured by eating mangel wurtzel; a circumstance, which excited intense interest not unmixed with serious apprehensions and gave rise to much discussion in the periodicals of the day on the merits of that root. There was no instance however, in the Willowbank Dairy of any bad effects resulting from the use of it. The quantity given as a mixture, however, was comparatively *small*, except on the occasion just noticed, when trial was made of it with the turnips; and before that trial was made, the roots had laid a considerable time in a dry cellar, whereas Mr. Cokes' cattle had the roots and leaves when full of juice.

These statements by Mr. Harley, seem to me of considerable importance. I have had considerable experience in raising both the mangle wurtzel and the ruta baga. The mangle wurtzel is a far less certain crop than the ruta baga. It yields often a great amount to the acre, though either through the seeds not germinating, or the plants being cut off after it came up: there were always large vacancies in the field, which vacancies however, I usually filled up with ruta baga. The mangel wurtzel was liable to be injured by the frosts, and in my own experience it has not kept by any means so well as the ruta baga. As feed for milch cows, I have found them always very fond of it; that it greatly increased their milk; but at the same time rather disordered their bowels and very much reduced their flesh. I have given it always however in good quantities, at the rate often of a bushel after being cut, to a cow per day.—Some gentlemen, for whose skill and experience I have great respect, have used and highly approved it. John Lowell, Esq. speaks of its use for milch cows in terms of strong commendation. To ruta baga, I have no objection to be urged excepting the taste which it communicates to butter and milk. Cobbett in his enthusiasm for ruta baga insttsted upon it, that this peculiar flavor was absolutely agreeable; but to many persons it is extremely nauseous. If the turnips are sound and no decayed parts are given, this taste is not always perceptible; but it becomes so as soon as it is heated, the butter being melted or the cream or milk applied to tea or coffee. There is said to be remedy for this taste by using a very small quantity of a solution of salt petre in water, in the milk as it comes from the cow; but I cannot in this case speak from experience.

Mr. Harley continues his account by saying, that instead of attempting the ill-judged economy, which pinches the cattle of their food, every attention was paid to make each cow eat as much as possible without running into the opposite extreme of overfeeding; and for that purpose the mixture was occasionally varied; and sometimes a few raw potatoes or turnips were given by themselves, which tended to whet the appetite. There is a Scotch proverb which says, "the cow milks by the mow," and as the object of the Harleian Dairy was to fatten as well as to yield, the more care and good management were exercised in their feeding, the sooner these objects were accomplished.

Young grass and green barley, but particularly young clover, contain a great quantity of juice, and fixed air, which has often proved injurious to cattle. The irrigation with urine made these crops luxuriant and rich: The first cutting was therefore mixed with a large proportion of old hay or straw, to which was superaded a good quantity of salt, to prevent the cows from swelling or blowing. When wet a greater proportion of these ingredients was used; this mixture was allowed to stand from twelve to twenty hours, and was frequently turned and shaken to prevent heating. Young or wet clover was never given without a mixture of dry provender. By this means the rich juices of the green food were absorbed by the dry fodder, which enabled the cattle to feed freely without the risk of injury.

In proportion as grass decreased in the autumn, turnips became a substitute. As the season advanced when grains and distillers wash were plentiful and cheap, which was generally the case in winter, a large proportion of these was given with the more succulent food; but they were apt to make the cattle grain-sick, and to prove injurious to the stomach of the animal. It has been ascertained that if cows are fed long upon grains of distillers' wash, their costitution will be quickly destroyed; cattle thus fed should not be kept longer than eight or ten months. One effect of this copious feeding upon distillers' wash, as we have learned, at the New York city establishment, is that after a while the teeth of the cows thus kept become loosened; and they are unable to masticate any hard or long food. It seems to be a pretty fair inference that where the constitution of an animal becomes thus affected or diseased, the quality of their milk is likely in a correspondent measure to be injured. Of this however, the buyer is not able to known any thing, and it is not for the interest of the seller to inquire too particularly.

A little boiled linseed was considered the best antidote for preventing distillers' wash, &c. from injuring the health of the animals; and wheat straw, cut short, mixed with the grains, also prevented the cows from being sick.

When grains were abundant in the market, large quantities were stored at Willowbank in deep pits, and it was found that the deeper and larger were the pits, the better were they adapted for the purpose. In these pits the grains were first hard trampled; and afterwards in order to preserve them from the effect of exposure to the atmosphere, they were covered with mould and sown with grass seeds, or when it could be obtained, turf was laid on. If carefully stored in this way, it was found that grains would keep in good condition two or three years without salt; and there can be no doubt that they would keep for many years if it were possible completely to exclude the atmospheric air. It may be mentioned by the way, that when any of the pits were opened, the mould that was next the draft emitted a very unpleasant smell; a circumstance, which tended to excite unfavorable

prejudices in those who did not examine or taste the grains. These had always an agreeable acid flavor, a sure proof of their wholesome condition. As the spring approached, it was customary in the feeding process to substitute the Swedish turnips and potatoes for the yellow turnips; potatoes being generally to be got at a very moderate price in the market at that season of the year.

These two staple roots, steamed with hay and other mixtures, continued thenceforward to be the soft food until grass was again in season. Thus a proportion of succulent food was given to the cattle all the year round. The quantity of food given to the animals varied according to the quality or richness; but it was found very necessary to attend as particularly to *quantity* as to *quality*, because rich food by itself could not be taken in sufficient quantity to fill the stomach, neither could it easily be digested. The general rule in feeding therefore, was to give as much good wholesome stuff to each as the cattle would eat clean up, always taking care however, to administer it rather sparingly than otherwise in order to avoid giving them a surfeit. It is of the utmost importance to attend to this, for if the cow loathes her food she will neither milk nor fatten.

These rules seem eminentiy reasonable; and entitled to much consideration. The carelessness with which cattle are in general fed, as it respects regularity in time and quantity and quantity of food, is proverbial among farmers and most disgraceful as well as pernicious to their interests.

We shall continue our accounts of this celebrated and remarkable establishment in a future number.

HAY AND HAY MAKING—BY H. C.

The season of hay cutting is just at hand. An operation so simple as that of cutting and curing hay every farmer feels that he understands, and would disdain on this subject any attempt to advise or instruct him. Be it so; the wise are glad to examine any subject, on which it is possible discussion or inquiry may throw some light; correct prejudices, or suggest new and better means of management; the wise in respect to any and every subject are never too wise to learn; and though our own observations or suggestions on any subject may have no just foundation, no reasonableness, and no pertinency, they may be useful if they excite the inquiries and elicit the observations of wiser or more experienced minds.

Hay making must be set down as one of the most important operations in husbandry. Hay with us is the great means of supporting our live stock. Our straw is principally used for litter or the subsistence of our young cattle. Grain and meal are always given with reluctance, excepting to fatting cattle; and comparatively no succulent vegetables are grown for the winter keeping of our stock. It is hoped in this latter case there may be a speedy alteration in the habits of our farmers; and that it will become as much matter of custom among our farmers to raise large crops of vegetables, with which to store their cellars as large crops of hay with which to fill their barns. Common white turnips, though very little in favor with us are a valuable crop both for sheep and neet cattle. The yellow varieties are still better, as they are more solid and retain their good qualities much longer. The ru:a baga is a most excellent vegetable for sheep, cattle and horses. Potatoes, carrots, mangel wurtzel are all excellent. An agricultural friend well qualified to judge informs me that he prefers to all others the common blood beet. He asserts that according to his own experience, it is as sure a crop as any other; that it yields as much to the acre as any other; none will make more milk or put on more flesh; none if properly taken care of will last longer; and none of equal value is raised with more ease or at less expense. My own experience in their cultivation and use disposes me to give almost entire credit to all these statements.

It would seem to be most important to the health of our animals, especially considering the length of our winters and the time during which they are confined to the stall, that they should have green and succulent food to mix with their dry; and that dry especially not of the best quality. Certainly very much of our hay is spoiled in the getting—It is cut not at the right time. It is made either too much or too little; so much as to become too huskey and dry or so little as to be heated and mouldy; in either case much of its nutritive power is lost; and though it may sustain life, cattle by the use of it lose their condition and become diseased; poor, hide-bound, costive and consumptive.

The time when hay should be cut is a matter not well settled and in which farmers in different places differ with each other. Different grasses ripen at different periods; and with some the season of flowering continues much longer than with others. It is ascertained likewise by chemical analysis that grasses at different periods of their growth yield more nutriment than all others. What in some parts of the country is called the English Bent, a fine and delicate grass must be cut very early or it becomes hard and wiry. Herds grass or Timothy in order according to the experimenrs of Sinclair, must be allowed to reach an extreme ripeness in order to yield the greatest amount of nutritive matter. We have some incredulity in regard to the statements respecting this latter grass and some hesitation whether these experiments, though highly exact and instructive, are to be considered conclusive as to the actual value of these grasses for feeding; and should deem some exact experiments with the cattle themselves made under favorable circumstances and by skilful and careful observers, much more decisive.

The time of cutting for most grasses is when they are in flower. If cut before this they waste greatly and have little substance; and if suffered to stand long after this they lose their succulence. It is advisable in this matter to be early rather than late; and to cut before the plant is exhausted by flowering or by forming seeds. It is then in the highest perfection. The time for cutting clover is longer than of other grasses as it continues longer sending out a succession of flowers; but I am decidedly of an opinion that the sooner this grass is cut after it comes into flower, the better, as it is so apt to lodge and to become mouldy at bottom.

On the subject of the time of cutting grass I am happy to quote the opinions of a very able writer. "This rule of cutting grass, when it first comes into flower applies to every species of herbage, which is to be dried for winter food; but to coarse hay the produce of wet or marshy grounds, it is strongly applicable; for most of the plants, which grow in these situations, when they are in full vigor are as tender, and contain perhaps as great a proportion of nourishing juices as any other description of hay; and when cut at that stage and properly managed afterwards, form a valuable article of food both for sheep and cattle; but when the cutting is delayed, as indeed it very often is, till an advanced period of the season, when the plants have not only reached their ultimate growth, but begin to decay, this description of herbage becomes at once the coarsest and least nourishing of all food. This opinion does not proceed upon theory; but upon the solid grounds of experiments carefully made upon different kinds of herbage, at different periods of their growth, the result of which establishes a fact which cannot be too generally known, viz: that plants of all sorts, if they are cut when in full vigor, and afterwards carefully dried, without any waste of their natural juices either by bleaching with rain or exhalation, contain weight for weight, a quantity of nourishing matter nearly double what they do, when allowed to attain their full growth; and make some progress towards decay." These opinions are stated with great confidence; and are entitled to much consideration; and so far as they apply to our wet meadows deserve particular attention, since the cutting and curing of these grasses receive very little care; they are left standing generally until very late in the season; and the hay from

them commonly is almost worthless, excepting for litter.

"In the survey of Perthshire, Eng. it is stated that as the great object of making hay is that of preserving as much of the natural sap as possible, the proper time for cutting it is when the crop of grass has attained its highest degree of perfection; when the plants are in full blow, and before their flowers begin to fade. If cut too green the hay shrivels and losses much of its bulk; if allowed to stand till the seeds are ripe, the steam becomes hard and wiry; the roots loose much of their natural sap; the aftermath is less abundant; and the principal part of the hay is in danger of crumbling away into short stumps, under the various operations which it must undergo. Better to be too soon than too late, especially if the crop be heavy and in danger of lodging."

"With clover the best time for cutting it is when the flowers are all fully blown and the earliest begin to turn brown. If allowed to stand longer, the roots of the stalks lose their leaves, and become hard and sticky; and the plant is so much exhausted that it takes a long time before it sends up new shoots."

With respect to curing hay it is important to put it into the barn in as green a state as will possibly do and avoid its heating and becoming mouldy. In this way it best retains its succulence and flavor; and the nearer in both these respects it approaches to grass in its green state, so much better is it relished by all kinds of stock, and so much the more nutritious it undoubtedly is. The best farmers, on the Connecticut river, and where they extensively engaged in the feeding of cattle, have within a few years been accustomed to put their hay in the barn in a very green state and after a slight making. They deem it of the first importance that it should have no foreign dampness adhering to it either of dew or rain; but they do not object to its heating slightly in the mow from the fermentation of its natural juices. They are of an opinion that this even renders it the more palatable for the cattle; but wetness either of dew or rain is altogether injurious to its quality: produces sourness, and mould, and renders it innutritious, unfit for the use of cattle; and extremely pernicious to horses. The English farmers think their hay is better for a slight heat in the stack.

Two things in the curing of hay are to be particularly attended to. The first is to secure it from wet. The effect of wet upon hay is like the effect of water upon tea to extract all its strength and flavor. For this reason the practice of some farmers of mowing in the rain by way of saving time, and suffering the hay to remain wet and entirely saturated with water in the swath, under the impression that it would suffer no injury though it should remain so twenty four hours, proceeds very erroneous opinions; and is to be strongly condemned.—The practice likewise of cutting grass when a heavy dew is upon it, is, on the same grounds to be disapproved, excepting that in this case that it is very soon stirred and shaken. We should prefer, excepting that we might sometimes find that it compelled us to the loss of too much time, never to have a swath mowed but when the grass and ground are perfectly dry. The grass is not mowed so easily when dry as when wet. It requires more strength and the edge of the scythe suffers more; but the grass, which is cut when perfectly dry and the ground under it likewise being perfectly dry and warm, is made with so much more quickness and ease, that this consideration, which will go far to balance the supposed or actual advantages in the other case.

The second important point is to avoid getting the hay too dry and stirring it so much as to shake off the leaves. These constitute the most palatable and nutritious part of the hay; and this is particularly likely to happen in respect to clover, which if very much dried and shaken becomes little better than so many sticks. Clover can be well cured in cocks, without any turning, but that of reversing the heaps.—This method has been often tried and with entire success. Salt is always to be applied in these cases at the rate of a peck to a load; and to all English hay the addition of salt to the amount at least of four quarts to the load is always to be recommended.

Spreading out, as it is termed, is an operation that should be done by a most careful hand. Clover hardly admits of this when green, and, if attempted when dry, the best parts of the hay are sure to be shaken off. Other kinds of hay however, cannot after mowing, be too carefully opened and too evenly spread; not a matted handful should be left that is not thoroughly separated and shook out. Hay at night, if it can be done, should never be left in swath or in windrow; but put up at first in small cocks and afterwards made with no more shaking about and spreading than is absolutely necessary to dry it. We have already extended this article beyond our intentions and yet have not exhausted it.—We commend it to our brother farmers, not presuming that we can instruct them; but hoping that we may at least draw their attention to a subject of great importance in husbandry; but which we think has by no means as yet received sufficient consideration and care.

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MODE OF WEANING AND REARING CALVES BY A NORFOLK FARMER, ENG.—Mr. Whitley of Wallington did, between the first of December, 1776, and April, 1777, wean and rear on his farm ten cow calves and thirteen bull calves, by the method following: At three days old they were taken from the cows, put into a shed and fed with fle (skimmed milk) allowing three quarts to each calf morning and evening. When a month old, they were fed with a like quantity of milk and water, morning and evening, with hay to feed on in the day time; and at noon they were fed with oats and bran equally mixed, allowing half a peck to one dozen calves. At two months old they were fed only in the morning with milk and water; they had hay to feed on in the day time, and at evening instead of noon, had the same quantity of bran and oats with water to drink. They were fed in this manner until the middle of April, when they were turned out to grass all day; and taken into a shed at evening; and fed with hay until there was plenty of grass and the weather grew warm. Such of the calves as were weaned in March were continued to be fed with milk and water, every morning until midsummer. All the said calves are in good health and condition; and the Society allowed the premium offered on that head the preceding year.—[Bath Soc. Papers.]

Rearing Calves, 1789.—In the year 1787, I weaned seventeen calves—in 1788, twenty—and in 1789, fifteen, do. I bought in 1787 three sacks of linseed. I put one quart of seed to six quarts of water, which by boiling ten minutes, became a good jelly; this jelly is mixed with a small quantity of the best hay steeped in boiling water.—Having my calves drop at different times, I did not make an exact calculation of the expense of this hay tea; but of my sacks of seed I had better than two bushels left at last, I gave them the jelly and the hay tea, three times a day; to the boy who looked after them 6d a day; the price of the linseed was 4*s*. 6*d*. stg. per bushel; the whole three years seed 2*l* 5*s*. My calves are kept in good growing state; and are much better at this time than my neighbors, who are reared with milk; they do not fall off so much, when they come to grass.—[Bath Soc. papers.]

For the New York Farmer.

QUESTION—Where you bound, stranger?

ANSWER—I am going to the Far West, sir.

Since my last which was written on my journey to Pittsburg, I passed some time in that flourishing city which approaches much nearer Burmingham in England, than you would suppose any thing in this new country could; I descended the Ohio to Wheeling when I took the national road which is now completed to Columbus 74 miles from Wheeling. The country through which it passes until you reach Zanesville, is quite a hill and dale country, the farmers turning their attention to raising Tobacco, and some have large flocks of sheep, to the raising of which the soil appears peculiarly well adapted, that animal thriving much better on high and dry lands. After passing Zanesville, the country is more level and alluvial,

the canal connecting the Ohio and Lake Erie, 300 miles in length, is very productive and the lands bordering have risen much in value, large entries of State and United States lands have been made in Ohio the past year, and the wealth of this State is increasing probably faster than any State in the union. Columbus the seat of government, is beautifully situated lying on very high land, the public buildings are numerous and what is particularly gratifying to the traveller, the public accommodations good particularly Noble's Hotel. As many of your readers are emigrating West, and as they generally prefer stopping short of "*the far West*" prefering Farms partly brought to a state of cultivation to those which are at less price and untouched, I will close this with statistical information of Ohio, and in my next give you that of the adjoining State of Indiana, hoping it will prove acceptable to your readers.

Ohio was organized as a State in 1802, though the first settlement was commenced at Marietta in 1788 by Gen. Putnam, and 46 six other hardy and enterprising individuals from Massachusetts, Connecticut and Rhode Island.

The river Ohio gave name to the State, although Historians do not agree as to whether Ohio means Beautiful River, and taken from the French explorers or Bloody River as the Indians designated it, at any rate it is a beautiful name for River or State.

Ohio contains an area about 200 miles square, being about 200 miles in extent from North to South and from East to West, being bounded north by Michigan and the Lake, west by the State of Indiana, and east and south by Pennsylvania and the Ohio river. The population may be safely set down as one half million of souls.

Literature is very flourishing. There are eight Colleges in this State besides many Academies and Literary Societies, Lyceums, &c.

Also a Deaf and Dumb Asylum, Medical College, &c. There are also upwards of one hundred newspapers printed in this State, a large proportion are published semi-weekly.

Canals and Railroads are constructing in various directions, as a very liberal policy seems to have been entertained towards works of this sort for some years.

There are also upwards of twenty Banking Institutions that are as well managed as Banks can be, and whose notes pass currently in all the adjoining States.

It is stated by an intelligent gentleman conversant with the fact, that Ohio enjoys one hundred and ninety miles of ship and steam boat navigation on the Lake, and four hundred thirty six miles steam boat navigation on the Ohio. These great local advantages, united with a soil abounding in every production and luxury of life, must inevitably give Ohio at no distant day, if not the first, at least the second rank in the United States. The climate is warm and solubrious. The people remarkable for their observance of the Laws, and particularly for the spirit of industry that seems to exist in every section of the state.

Yours truly,

B. P.

RURAL SCENERY: THE THATCHED COTTAGE. BY JUNIUS.

There are but few objects in landscape scenery that form a more *rural* characteristic than the "thatched cottage," by the side of a wood, which serves to protect it from the cold winter blast, and has the effect of a shady retreat for summer. To impart to the traveller pleasing ideas of the fertility and domestic comforts, blended with rural economy, of the country through which he passes, is, perhaps, one of the very best criterions of his opinion of the more rapid improvement and increase of the value of property; and the 'cot' spoken of is one of the sure features to attract his particular attention.

There is something about a thatched cottage which is always inviting, and reminds us of the comforts of life. I disagree with Dr. Johnson, who deems all things of a rustic nature, as the abode and choice of the unrefined; or, in plain words, expressive of rudeness in every degree.

I very much doubt if the greatest monarch is more intelligent, oftentimes, than those who dwell beneath a cottage of thatch; nor are his domestic comforts any more elevated or constant than the cottager, although fame extends his name to a more distant part, where rumor often falsifies his real charecter. The cottager rarely has any thing to fear on this subject, as his only object is to make *home* agreeable to himself and its inmates; and this effect being observable to the passer by, it engraves on his memory the *snug* appearance of the thatched cottage.

Snugness is not altogether the only feature displayed in such dwellings, but there is a character of retirement, blended with hospitality. By general observation, it will be seen that the sites of such dwellings are well chosen where the requisite comforts for domestic purposes are of easy access. Shelter and shade are the first consideration in this case, and are a grand feature, namely, the fine impression given on landscape scenery. The rustic construction of the cot is always pleasing when we can see natural materials in every way made useful, and not too much transposed into something, of which all recollection of its primitive state is lost, to appearance. The thatch, being of straw, reminds us of the utility it has been in another way—when the bearer of grain; and the rude unhewed post of the porch (on which twines the honeysuckle) of the use of forest trees The plan of the cot is mostly neat, and generally in the Gothic order, with the upper windows peeping out of the thatch. The approaches and appendages are always corresponding. The rustic arbor well covered with native grape vines that give a natural effect, and impart a luscious reward to the humble pruner. The approach is generally converted into neat and well kept flower-garden, which gives a healthy employment, or rather recreation, to an aged mother or some rosy cheeked prattling children, who are often seen strolling from their plot in quest of flowers to decorate the little parterre, transplanting them with care to their new habitations among, perhaps, some delicate exotics.

The vegetable garden, well filled with esculent vegetables and fruit, with a small orchard and meadow, are often appendages to the "thatched cottage." A running stream or brook in its vicinity gives a mellowness to the scene, and some rich verdant spots near the dwelling forms a part, of social effect, but seldom rivalled in landscape scenery.

Were I to choose a dwelling for retirement, when age wears off that activity and zeal from a life of bustle and business, it should be the cot above spoken of; not, gentle reader, that I would be conspicuous at that time of life, but because it would suit my desire. The wood would be a pleasing source for my researches of botanical specimens of native plants, and the trees and shrubs about my dwelling a fine retreat for the different kinds of birds which would visit my 'cot,' as their migrations suit their approach in the neighboring wood. The honeysuckle would impart, in the flowering season, a luscious repast to the little queen of birds—the humming-bird; and my flower-garden would serve to amuse my leisure hours in healthy employment. The fruit, raised by my care, would add to its flavor, and some to give to a friend, to friendship. A few choice books for my amusement, and to recall what had been seen and done in horticulture; and, at times, to read to relatives and friends, who should always find hospitality in my rustic manners, and the welcome repast of the wearied traveller, sums up my desire of a thatched cottage.

JUNIUS.

New Jersey, April, 1836.

We copy some interesting suggestions to-day on the cultivation of *Strawberries* from the essay of an English gentleman in this country.

STRAWBERRIES—BARREN AND BEARING.

This fruit is certainly quite as fine here, as in England. We have the real Hautbois—that Queen among strawberries—of which very few people in this country have eaten, for the fruit which is so called by many gardeners, is not the true Hautbois, although it be a little like it in perfume. What is in general thought to be Hautbois is nothing more than the Alpine, a small light red strawberry, which falls from the stem as easily as the rasberry does; the real Hautbois, however, does not ripen well in the upper part of the state of New York.

Independently of the slight approach to the perfume of the Hautbois, the Alpine plant resembles it in shape and peculiarity of leaf, which is deep green, glossy and crimped. In fact, the leaves of both are exactly alike excepting in size the true Hautbois being twice as large as the Alpine. The flowers of the latter are very different, the male and female flowers are on separate plants. The female blossoms can easily be distinguished from the others; the former appeared like a green turf, with small yellow dots around the base of the circumference. The male flowers are studded with

stamens, about a third of an inch long, having little yellow heads filled with the farina.

The fact is so settled and certain, respecting the sexes of plants, that it is almost absurd to enter into any argument about it; yet so much ignorance and carelessness prevails among the cultivators of strawberries, that the knowledge which men of science have obtained is of no avail. I once heard a gentleman say that his strawberry plants always bore fruit and that no care was taken to observe the due proportion of barren and bearing blossoms! This person was a botanist—a closet botanist—one who was used to pick up flowers in the fields, in woods, in the crevices of rocks, and had plants sent to him from abroad! He would talk for hours on the subject, and was in full correspondence with the learned of Europe! He knew of the difference, to be sure, but he insisted that nature regulated all this matter and never left any thing to chance.

We frequently hear of beds which blossom freely and yet never bear fruit; ignorant people attribute the failure to frost, to a too rich or a too poor soil; and in fact a hundred reasons are given for the loss of fruit. "My soil is not suited to strawberries," said a gentleman one day to Dr. Bently, "and I am compelled very reluctantly to give up the pleasure of raising them. I have tried various positions for their location, and have made experiments with different kinds of manure, to no purpose. I have tried to raise them on rich sandy loam and on poor land, but if I get a crop one season, they disappear in the second. Nay, so unsuited is my soil to their nature, that those runners which crept under a fence into a rich border of my garden, from a neighbor's bed, which always bore abundantly, never even made a show of fruiting. You can look at them now, they are not quite out of blossom."

Dr. Bentley examined the plants—they were all males. He then went to the neighbor's garden, and saw there, likewise, that there were very few bearing plants. "You will not have many strawberries this year," said the Doctor to the gardener.

"Oh! you are mistaken," said the latter, "There was the greatest show of blossoms I ever saw, and there has been no frost to hurt them."

"Well—take my word for it, my friend," said the Doctor, that this bed will not give you six quarts of strawberries this year, and if you do not weed out all the plants that bear these blossoms,"—pulling up some male blossoms—"and fill in the vacancies with plants of this kind"—shewing him the female blossom—"you will have no fruit at all next summer."

The man sneered at the Doctor—he had but few strawberries, as was predicted, and the next summer about the time that he expected the fruit to set, not seeing any, he dug up the bed and made a new one!

A strawberry bed never will fail in any kind of soil, if the proportion of bearing and unbearing plants be as one of the latter to ten of the former. Excess of rain or drought, cold or heat, may injure the size and flavor of the berries, but strawberries there will be great numbers, if not of good quality.

You may recollect when school boys, that for two successive years we had no strawberries in what we called our own little garden. We thought we had "killed them with kindness" as we were constantly working among them and keeping them free from weeds. The plants grew well and blossomed well, but they did not reward our care, for they gave us no fruit. I now know that all the plants must have been of one kind.

Mr. Thorn sent to a gentleman in Burlington for some plants of the Higbee strawberry. They arrived in good order after a fine August rain of two days, and the next May they were all in flower—but there was not a female plant among them. Two or three runners had been set apart themselves to give runners for a new bed; from these runners, which happened to be all males, the plants which were sent to Mr. Thorn had been taken. Mr. Thorn did not find out the cause of this misfortune until our good Doctor saw the blossoms; of course the whole bed had to be dug up. If they had been female plants, it would have only been necessary to take up every tenth plant and deposite a barren plant in its place.

The male plants of certain kinds of strawberries are more apt to send out runners, than the female. For instance: in the Higbee, the male plants would soon cover the bed with their runners to the exclusion of the females, whereas in the real dark brown Hautbois, the female plants are strongest and completely occupy the ground.

The best plan therefore is to have a few plants of both sexes in different places, that a proper proportion of each may be taken to make a new bed. This precaution is necessary with the Hautbois, because there is no difference in the shape of the leaf, and of course we never could tell the male from the female, unless the plant were in blossom. But in the Higbee, or large solid preserving strawbarry, the case is different, the latter being rounder, fuller, thicker, of a paler green, more cramped, and less glossy. A practiced eye can tell the difference between them immediately.

One reason why the Chili strawberry is said to be a "*she bearer*," is because the barren plants soon predominate. But if one steady course be pursued, there will be no trouble with the cultivation of any of these strawberries which have male and female blossoms in different plants.

A strawberry bed, well managed, must never have a single runner in it. The plants should be fourteen inches apart each way, if in a private garden; but if the fruit be for sale, then they should be ten inches apart in one direction, and three feet in the other, so as to allow the hand plough to be used between the rows. This hand plough will save a great deal of labour, as three men, (horses will not do) will turn over more ground, and more effectually, in one hour than these three men could do in twelve, with the spade.

When the first season is over, Dr. Bentley, with a garden tool, called a half moon, cutter, has all the dead and broken leaves, as well as the runners cut off close to the plant. The hand plough is then used, and thus the plants have time to recover from the tugging, and pulling, and trampling which they have undergone during the period of yielding fruit.

From the Farmers' Register.

THE SEASON AND STATE OF CROPS.—From all the accounts before us, public and private, it is inferred that the wheat crop throughout Virginia, will fall short of half of an average crop—and that the whole wheat crop of the United States will be not much better than that of Virginia alone.—We subjoin in extracts from private letters, many of the facts that have reached us; but none of these, except the one from Halifax, Va., even refer to the latest and worst calamities, caused by the inundation of most of the rich and extensive river bottoms of Virginia and North Carolina. The great source of injury to the wheat, and which was anticipated as far back as last October, and expected then to be unusually destructive, was the Hessian fly. In addition to this, and to other minor evils, the very wet season latterly has done great damage, either by filling the soil with water, or entirely overflowing its surface. In the latter part of May, and first half of June, there were 21 days in succession, on which more or less rain fell—and some of these rains came in floods: and even since the close of this uninterrupted series, there has been an unusual quantity of rain. On high land, the usual estimates of crops expected, vary from one fourth to three fourths of an average. In some fewer cases, they are worse and better than these ordinary extremes, varying from nothing worth reaping, to nearly a fair product. Of the latter cases, very few have been heard of—and those not very lately. From the newspapers, we learn that in Buckingham and the nearest adjacent counties, the wheat was tolerably fair, and near Wheeling, still better; if so, these are the only parts of Virginia as much favored, of which we have heard. On our own farm, we cannot estimate the crop of wheat at more than the fourth of what the land could produce; and where the damage from the fly was the least, and the general growth the best, there the damage was the greatest from *scab*, or empty or dead parts of heads. The quality of the grain will be very bad.

But the rich bottom lands on our rivers have suffered most. These have all been covered by freshets, and to unusual depths. The Roanoke bottom lands have suffered most. The wheat there is almost entirely destroyed, as well as all other crops—and the soil itself, in many parts, has been carried off by the floods, so that the damage to the land is even of more amount than the entire loss of the year's crops.

Two more days (the 25th and 26th) have passed since the foregoing remarks were written, and on both rain has fallen profusely and heavily; the consequent increase of damage to the wheat will be necessarily great. Where ready for the scythe, it must be much beaten down and tangled by the heavy rain of last night; and where still green, there is danger of the rust coming to destroy much of the quantity and value of the small product previously expected.

June 27th.

We notice in a paper published at Marietta, Ohio, an advertisement of Mr. John Platt, of that place, announcing that he has succeeded in cultivating the genuine Tea Plant of China. It would appear that this gentleman has raised the plant for some years past at Marietta, and has at length discovered the art of drying and manufacturing the leaves into a quality which he considers not at all inferior to imported Young Hyson: he offers to furnish fresh seed of the last years growth, gratuitously, to any person desirous of pursuing the cultivation.

From the Cortland Advocate.

☞ The Syracuse, Cortland, and Binghampton Railroad Central Committee, it will be seen by the following notice, have called a meeting of the Commissioners named in the bill incorporating the above named work, and although the proceeding may not be strictly regular, it will be excused, as it cannot result prejudicially to any one, and as it secures great despatch, and is more convenient than any other method. The step was taken by the Central Committee, at the request of the resident Commissioners.

The Commissioners to open the books, etc. of the "Syracuse, Cortland and Binghamton Railroad," are requested to meet at the Eagle Tavern, in Cortland Village, on Tuesday the 12th day of July next, at 12 o'clock M:—

The Commissioners are as follows:—Henry Stephens, Eleazer W. Edgcomb, Augustus Donnelly, Samuel G. Hathaway, Edward C. Reed, Roswell Randall, William Randall, Samuel S. Foreman, Elam Lynds, Myrom S Mills, Henry F. King, Daniel Dickinson, Joseph S. Bosworth, and Thomas G. Waterman.

WILLIAM RARLITT,
ADIN WEBB,
HENRY S. RANDALL,
Central Committee.

LITTLE FALLS.—This picturesque and thriving village is situated on both sides of the Mohawk river, 72 miles west of Albany, and 22 miles east of Utica. The great western canal passes through it, on the south side of the river, and is connected with the main part of the village by a beautiful stone aqueduct over the river, which serves as a feeder, receiving the water from the old canal on the north side, and affording to the village every convenience desired for business.

This beautiful village was, until within a few years, owned by an English gentleman,) Mr. Ellis, we believe,) and its *immense* water power was for many years, indeed almost since the revolutionary war, nearly useless, as the proprietor declined to sell, or even to give permanent leases, and the village of course made but slow progress in the march of improvement which has marked the course of many less favored places farther west.

Fortunately, however, here, as in many other places, a change has come over the aspect of things—a foreign proprietorship has given way to one of true American spirit. The title was about two years since transferred to a gentleman of this city, who viewed things as an AMERICAN. He caused the property to be surveyed, streets and public squares to be laid out, and has contributed largely to the erection of churches, and has sold freely and at fair prices to those who desired to improve its advantages. Those who, like ourselves, recollect its appearance *twenty* years ago, and have witnessed its progress under the fostering care of its present proprietor, need no description of its present condition, or its delightful surrounding scenery—but to those who have not witnessed its beauties, a brief description may not be uninteresting.

The village of Little Falls is situated in a narrow defile, which appears to have been formed by the waters of the river in its passage from the lakes to the Hudson. On the west, and also on the east are the beautiful and fertile flats of the Mohawk; but on the north the village is hemned in by hills, covered with forest, approaching in some places nearly to the water, with abrupt and almost precipitous acclivities; whilst in other places the village extends for half a mile or more from the main street. It is on the south side, however, that we behold the mountains in their majesty. The canal, which hugs the side of the precipice, and winds its way amongst the rocks, is about 30 feet above the river; and the summit of the hills are more than *three hundred feet*, and in some places almost perpendicular, above the canal. This was indeed a herculean task; and to others than Americans, an attempt to construct such a work would have been deemed almost chimerical. It was however, accomplished, and is now the admiration of the hundreds of thousands who annually pass on its waters.

The improvements of the place are progressing with spirit—its water power is estimated equal to 750,000 spindles and several sites with power have recently been sold.—There are now in operation three furnaces, one turning shop, three paper mills, one machine shop, two saw mills, one flouring mill, one grist mill, one plaster mill, three tanneries, one distillery, two malting houses, three blacksmith shops, one axe and scyth factory and one carriage manufactory. A woollen factory, and two flouring mills with four runs of stones are to be erected the present season. This place being the centre of a rich agricultural country carries on a considerable trade with Albany and New-York. The item of cheese alone produced in Herkimer county, and shipped by its merchants, on the canal during the last season amounted to upwards of $350,000.

It is surprising to us who know and appreciate its advantrges, that a situation so eligible, so healthly and with such immense water power should have been until this period overlooked by this shrewd money making and speculating community. They will not longer be disregarded as proper attention is now directed to it; and the period is not distant when LITTE FALLS will boast of its numerous manufactories, its rapidly increasing, intelligent, and wealthy population and its flourishing schools. May it long continue to flourish; and its worthy proprietors, as well as its enterprizing population, reap a rich reward for their labor.

From the American Gardener's Magazine.

NOTICE OF SOME OF THE EPIPHYTÆ, AND PARASITIC PLANTS OF THE U. STATES, WITH REMARKS ON THEIR PHYSIOLOGICAL CHARACTERS. BY JOHN LEWIS RUSSELL, PROF. BOT. ETC., TO THE MASS. HORT. SOC.

Although the tropics are peculiarly rich in these curious vegetables, which luxuriate in the dark and rapidly growing and decaying forests, yet even our more northern clime, can furnish a few no less interesting to the lover of science, though far less attractive to the artificial taste of the florist. Several genera may be found in the New England States, which, independent of their parasitic character are remarkable for the singularity of their form. In your summer ramble through the dense and damp woods, you may perchance meet with a curious cluster of brown, or yellowish, and extremely succulent, vegetables, covered with a pubescence, and instead of leaves, invested, with minute scales. Should your curiosity prompt you to stoop and examine the anomalous and fungous-looking body, you will discover, gentle reader! the curious and beautiful native epiphytic *Orobanche*, whose minute examination may repay your attention.—This genus forms the type of the natural order of *Orobancheæ* of Jussieu and of Lindley, and under this same order is its cogenus *Epiphagus* of Nuttall; which being a parasite on the roots of the beech (*Fagus*) has received from him its beautifully appropriate name One species, the "E. americanus," is said to be found in Maine, but not in this vicinity.

Perhaps not far distant, and in the same ramble, you will notice the remarkable, and ivory Monotropa, in which nature seems to have forgotten her usual livery of green to invest one of her fairy and delicate production in a vesture of entire, unsullied purity. By a sort of desecration, it has received, in common language, the trival name of that instrument, which affords an exhilarating solace to many a devotee to the "fragrant weed." But however apt its resemblance or name, it may be a question, whether the simple taste which dictates the admiration of the flower, would not have proved as beneficial to the general happiness, as that more luxurious taste which invented both the name and its origin. Another cogenus, and you have Hypopithys, of which "H. lanuginosa" is by no means rare in the neighborhood of Boston, and is a distinct parasite, affixing its densely crowded stems to the roots of trees.

And have you not often observed the golden and glittering thread-like branches of the twining *Cuscuta*, climbing with an

aspiring habit, not unlike its more gigantic, though not parasitic sister vegetables, up the slender stem of some delicate grass or plant herb; by the rapidity of its growth, and predatory disposition, draining the very vital energy from its supporter, till overclimbing and overreaching, it still progresses onward, over the topmost foilage, and lays hold of whatever next presents itself, till all are involved in inextricable confusion; and then, as if in triumph at the mischief it has occasioned, cover its leafless, voluble stems, with a mass of clustered flowers?

The first growth of the *Cuscuta* exhibits an anomaly of a vascular plant with perfect seeds, germinating without any cotyledon. A few other plants arranged under the exogenæ on account of their organization, are, in common with this, in fact, acotyledonous. The absence of cotyledons, has led to the theory of their presence in a consolidated, and consequently unfolded or undeveloped condition.

Throughout the Western States, you will find particularly upon the branches of the elm, the sempervirent mistletoe (*Viscum verticillatum*), whose parasitic and epiphytic character, and supposed virtues so early attracted notice. It is one of the few plants connected with the superstitions of a barbarous age, and from its rare occurrence on the oak, was estimated, when discovered in that situation, as peculiarly sacred. But like many other things that have nothing but antiquity to recommend them, its fictitious good qualities are overlooked, while its more prominent character of disfiguring the branches of its otherwise graceful and elegant supporter, are only noticeable.

Farther south, in Florida, and on the sea coast of Georgia and Carolina, we meet with a species of the true and genuine epiphyte, in the "Epidendrum conopesum." This is the only representative in the U. States, of that curious genus. It has been found growing on the trunks of the noble "Magnolia grandiflora," both by Nuttall and Elliott, and by the latter, observed also on several species of oak.

In the last number of the American's Gardner's Magazine, for April, it is incautiously stated, in speaking of this plant, that it is "interesting as the only parasitical plant yet discovered in the U. States."—(p. 144, Vol. II.) It is true that it is the only epiphyte connected with the numerous congeners and co-species so common in other and tropical climates. That we have other parasitic epiphytes, has been already shown.

An almost innumerable family of less perfectly organized vegetable forms, which are to a certain extent parasitic, is composed of the Lichenes, Fungi, Hepaticæ, etc., but these deriving no necessary nutriment from the vegetables on which they are found, and growing also on the surface of rocks and of other bodies, are termed false parasites. None the less important are they, however, in the great economy of nature, which renders each minute particle of organized matter a great and necessary agent in her operations. Yours,

JOHN LEWIS RUSSELL.

South Hingham, April, 1836.

We deem that the following information may be of information to our agricultural readers.

TEAZLES.

A trial took place at the term of the Supreme Court sitting at Greenfield, last week, at which a decision was made, and much information elicited, respecting an important branch of business connected with manufacturing. It is reported in the Greenfield Mercury.

Lester Tilden vs. *Harvey Graves.* The plaintiffs reside in Barre, Vt. and the defendants at Hartfield, and the action was on a contract entered into in September last, by which the defendants engaged to receive all the merchantable teazles, not exceeding fifteen hundred thousand, that the plaintiffs might purchase and deliver between that time and 1st of March last, and pay therefor four dollars and fifty cents a thousand—provided that none should be considered merchantable, which should not *measure* one inch and five-eighths in length.

It appeared that soon after the contract was entered into, teazles had fallen to about $2 per thousand, and the price, during the time limited, had fluctuated in the market from $1 75 to $3 00.

About the first of February the plaintiffs had delivered 800,000 under the contract, which were received and paid for by defendants, although there was then a controversy in relation to the measure. Two days before the expiration of the time limited in the contract, the plaintiffs again purchased of Bodman & Root of Williamsburg, a large quantity of teazles, which they took to Hartfield and offered to the defendants, who refused to receive them, unless the plaintiffs, in determining which of the lot were one inch and five-eighths in length, according to the contract, would measure from *within* the husk at the bottom, to the end of the pitch or core only, at the top. The plaintiffs accordingly notified the defendants that they should leave the teazles at a place which they should designate, which they did accordingly, at the same time having the quantity determined by Mr. Stearns of Williamsburg, who had adopted the rule to measure from *outside the husk at the bottom to the firm part of the bur at the top*, allowing all those as merchantable which came up to one inch and five-eighths according to that measure, and throwing in all others as not coming within the provisions of the contract. Measuring by this rule, Mr. Stearns made out the merchantable teazles in the disputed lot to be 642,000 in number.

Here was the *knob* of the case—and there was much testimony of manufacturers and dealers upon it. The rule adopted by Mr. Stearns was supported as the usual and true one by his testimony and that of Mr. Isaac Gere and Mr. Sanderson of Williamburg; while Mr. Buckland of Springfield, and Mr. De Witt of Oxford, testified to one more favorable to the purchaser, which would have thrown out, as unmerchantable under the contract, about one hundred thousand of those included in Stearns's measuerment.

There was also much curious inquiry on incidental points into the customs of the trade—the state of the market, &c.; and manufacturers from Leicester, Spencer, Oxford, Ware, Springfield, Williamsburg, Greenfield and Milbury, were examined upon the subject.

The jury found for the plaintiffs, and adopted the rule of Mr. Stearns as to the admeasurement. So let all teazle dealers remember that the proper way to measure teazles under a contract specifying the length, is from outside the husk at the bottom to the top of the firm part of the fangs or burs. The Court had instructed the Jury that the property in the teazles had passed but was yet in the plaintiff's hands; and that if they found against the defendants, they would be bound to assess damages to the amount of the difference between the market price or value at the time of the offer and refusal, and the price stipulated for in the contract. The jury had found these at 1505; but the parties, while the Jury were out, had agreed that upon the Jury's finding the measure and so the quantity delivered, the defendants should take them at a stipulated price. Judgment was accordingly entered for the plaintiffs for $2753 damages, and ninety-five dollars costs. The plaintiffs, with Bodman and Root who were also interested with them, have probably made a profit of between two and three thousand dollars upon this contract, including the profits on the eight hundred thousand first delivered.

One of the particulars relative to the teazle business, which came out in the course of the evidence, was that there were three kinds of American teazles known in this market, none of them quite equal to the foreign teazles, and all differing from each other in value. The Connecticut or Wethersfield teazles are the best native ones, and are worth twenty-five cents more by the thousand than the Williamburgh teazles which are raised in Williamsburgh, Hartfield, and vicinity. These last, again, are better than the Vermont teazles, which are raised principally in the Valley of the White River. One of the witnesses expressed the opinion, that the short summers of the north, promoting rapid growth, was the cause of the burs growing coarser and looser.

It is not a little singular says the Mercury, that no satisfactory artificial substitute for the teazle has ever been invented, though many have been tried. It is used, as our readers are aware, for raising a regular nap upon cloth; its long barbs being drawn over the cloth repeatedly till they have combed out all the knots and made it perfectly smooth. Should the barb of the teazle, when in use, become fixed in a knot, or encounter sufficient resistance, it yields or breaks without tearing or injuring the cloth—thus combining pliancy and stiffness to a degree which has not as yet been equalled by any mechanical contrivance for the same object. Both in England and in this country, it is emphatically termed a "casualty crop"—liable to a great variety of mischances, and of course exceedingly uncertain as to profit. We have been told that a large proportion of the teazle plants on the Connecticut river have perisehd during the past

winter: if this is the case, the price will of course run up again.

The average price of teazles in England is stated in an English work, to have been for some years past about three dollars per thousand. They have varied, however, in that country, from two to ten dollars, and the extremes of fluctuation have been yet greater in this country.

From the American Gardner's Magazine.

Observations on the Culture of the Plum, with Remarks upon the Insects infesting that Tree. By Messrs. C. and A. J. Downing, Botanic Garden and Nursey, Newburgh, N. Y.

The *plum* in some of its species, as the beach plum, (Prunus littoralis) and the Chicasaw plum (*P.* chicasa) is indigenous to many parts of the United States, but the fine cultivated varieties, now so abundant in our gardens, have been produced from an eastern species (Prunus domestica,) probably first introduced into Europe from Syria.

The cultivation of the plum in the Middle and Eastern States is exceedingly easy. The soil best adapted to that purpose is a moderately strong, light and dry loam; moist soils predisposing the tree to disease, and rendering it unfruitful. Gravelly and stony soils, though generally considered rather unsuitable, will be found excellent if the trees are planted in orchards, and receive that care in cultivation, peculiarly proper for such situations.

The plum not requiring walls in this climate, but growing with great luxuriance as an open standard tree, needs but little skill in pruning; the head of the tree should by no means, however, be permitted to become crowded with branches, but by judicious trimming, be kept open to the genial influence of the sun and air. Pruning, in the plum, as in all other stone fruits, should be performed while the branches are small, as the exudation of gum is induced by lopping large limbs, and the wounds heal with difficulty. To those persons who feel lost in the labyrinth of a modern catalogue of fruits, the following selection of plums, of first rate excellence, for a small garden, may not be unacceptable.

Yellow fruited.	Green fruited.
Washington,	Green Gage,
Coe's Golden drop,	Imperial do.
Drap d'or,	Flushing, do.
Yellow Gage.	Luscomb's Nonsuch.

Blue or Purple fruited.

Reine Claude Violette, or	Purple Gage,
Blue Imperiatrice,	Nectraine,
Kirk's,	Red Gage.
Imperial Diadem,	

The Reine Claude Violette, or purple gage, is one of the most delicious of plums. The Blue Imperiatrice is excellent, and keeps a long time after ripening. Coe's Golden drop and the Washington are very large and luscious fruit; and the Nectruine and Kirk's plum, are very beautiful, of large size, and fine flavored. The Azure Hative may, in addition to the above, be recommended as a very early variety, and the White Magnum Bonum, or egg plum, as being suitable for preserving.

Diseases of the Plum.—The plum tree is subject in this country, in many districts, to the attacks of two or three insects which commit great havoc in their respective methods, and which, owing to the culpable ignorance or negligence of cultivators, are permitted to increase and disseminate themselves, *ad libitum*. The first and most troublesome of these visitors, is the *Curculio nenuphar* of Herbot.* It is a small winged insect, searcely a fourth of an inch in length, furnished with a sharp rostrum or bill, with which it pierces the embryo fruit as soon as it is formed in the expanded blossom. Though the insect itself is too inconspicuous to attract the eye of a careless observer, amidst the countless myriads of ephemeral winged creations of a spring day, yet the watchful horticulturist may discover it in great numbers flitting about in the trees, while yet laden with blossoms, and puncturing the newly formed fruit to deposit the egg which is to continue its race. These punctures may first be discovered when the fruit begins to swell, and when it has attained half or a fourth of its size; they are very distinct to the eye, remaining in the form of a crescent-shaped scar, upon the surface of the green fruit. The egg in the mean time hatches, and the larvæ silently works its way towards the stem of the fruit, which, as soon as it has reached that point, falls from the tree. The whole crop is in many cases where the careless cultivator has suffered the annual increase of the *curculio*, drops in this manner prematurely from the tree, to the great mortification and astonishment of those persons unfamiliar with the habits of the insect race, who can see no cause of such a destruction of fruit. When the fruit has fallen to the ground, the grub or larvæ, obeying the instinct of nature, after a short time, leaves the now useless and decayed plum, and finding its way into the soil, remains there at some depth below the surface, to come forth in the succeeding spring, in its winged state, to go through its little round of existence again.

Countless remedies have been proposed for the mitigation of the evil, caused by the *curculio*, which are directed to the destruction of the insect in a winged state, when engaged in perpetrating the mischief, whilst the tree is yet in bloom: but there is but one easy, certain, and efficacious method of putting a stop to its ravages, viz., by destroying it in the larvæ or grub state after it has fallen from the tree, and before it has left the fruit. In plum *orchards* nothing can be more easily accomplished.—The cultivator has only to turn in his *swine*, and allow them to *devour the fruit daily as it falls from the tree. and every insect will perish.* This has been tested repeatedly, and with uniform success. The *curculio*, though a winged insect, is scarcely a migratory one, seldom leaving the neighborhood of the tree under which it emerged from the soil, and it has been found that, of two trees standing in adjoining gardens, one of them was attacked, and the fruit destroyed whilst the neighboring one, when pains had been taken to destroy the insects, remained laden with a beautiful crop. In small, gardens, therefore, when the number of trees is limited, it would well repay the trouble of gathering up and destroying the green fruit, as in a short time, the whole brood would be exterminated. It should be observed that when the soil has been trodden hard, when it has been paved underneath the branches, or in situations where the tree has inclined over a sheet of water, the larvæ of the *curculio*, not being able to find its way readily into the soil, perishes, and the trees bear abundantly. This is obviously the reason why the trees in the hard trodden or paved yards of cities, often yield such surprising crops—and the amateur horticulturist may draw a useful lesson from this fact.

Another most troublesome malady to which the plum is liable in some parts of the country, is commonly known by the name of the *knots*. It exhibits itself in the form of rough black *excrescences* upon the branches, of various sizes, from the scarcely perceptible swelling, to bunches of the size of the fist. If permitted to extend itself, it soon covers the whole tree, apparently disseminating its poisonous influence by the medium of the sap through the entire individual. On dissecting an infected branch, the wood and bark, in the discarded part, is found black and dry, and the whole vegetable substance is changed in appearance; if long diseased, the conducting vessels are dead and dried up, and this malignant influence may be seen extending itself upwards, first visible in the pith, and afterwards in the heart-wood, until the whole branch is destroyed. Upon opening these protuberances carefully, at a certain season of the year, the close observer will detect the larvæ of an insect of the weevil family, and which Professor Peck believes to be the same insect (the *curculio*) *Rynchænus cerasi*, which attacks the fruit—he having reared it from the grub that inhabits the excrescences of the cherry tree.—But we are inclined to believe this insect another and a totally distinct species, and shall endeavor, the present season, by rearing and placing it in the hands of some skilful entomologist, to set the matter at rest. Practically, however, this knowledge is, perhaps, of no great consequence, as it is known that the larvœ leave the diseased branches in July, and a knowledge of this single fact should be sufficient to impress upon the horticulturist the necessity of cutting off and extirpating (burning is the best method), entirely, all those branches which show the least symptoms of disease, before that month commences. In this way the insect may be wonderfully diminished in numbers, and probably entirely subdued.—The branches of some kinds of plum (fortunately the least valuable, as the horse plum and the damson) seem to be sought in preference, by the insect, when depositing its egg; but if its ravages are permitted to extend unchecked, the other and more precious varieties will also fall a prey. To so great an extent did the damage caused by this single insect spread, about thirty

*Rynchænus cerasi Peck.

years since, in some parts of the State of New-York, that scarcely a plum tree survived the disease, owing to the ignorance of its habits prevalent among the cultivators at that time.

There is but one more insect which is generally destructive to the plum tree in America—the *borer* (*Ægeria exitiosa*, Say), which attacks also the peach tree, and other stone fruits, just below the surface of the ground. The eggs of this insect are deposited in the bark of the tree, close to the earth, and the grub, upon hatching, penetrates further down, and *bores* its way around the trunk, and if undisturbed, completely destroys the albumen, or young wood, and ultimately causing the death of the tree. As these larvæ are always found in a particular place, technically called the *neck* of the tree, just below the surface of the soil, the proprietors of extensive peach orchards have found it the most effective and speedy method of extermination, to examine their trees every fall, removing the earth two or three inches deep, and upon the appearance of gum (a sure symptom), searching out and destroying the larvæ, with a knife for that purpose. A laborer, with trifling practice, will examine a great number of trees in a day, and with this slight annual care, whole orchards are, so far as the *borer* is concerned, preserved in most vigorous health. From successful practice, we cannot but think this the most unfailing method with the plum also.—Boiling hot water, poured around the trunk of the tree, will, without any injury, in many cases, destroy the larvæ; and soap-suds have been recommended for the same purpose. The public prints abound, lately, with accounts of the efficacy of a deposit of coal ashes around the trunk and roots of the tree, but we need some further proofs of the value of this remedy, before placing much reliance in its virtue.

Yours,
C. & A. J. DOWNING.

Newburgh, N. Y., April, 1836.

From the New England Farmer.

FARMERS' WORK.

ROOTS FOR CATTLE.—It is impossible to manage a farm to advantage, or raise stock to profit without feeding cattle with roots; and among the best of roots for that purpose is the ruta baga, or Swedish turnip. We believe that the person most instrumental in introducing the culture of that excellent root into the U. S. was the late William Cobbett. The following directions for raising that root are extracted from a treaties written by that famous agriculturist; and perhaps are as as plain and correct as can be prescribed.

Mode of saving and preserving the seed.—The ruta baga is apt to degenerate if the seed is not sowed with care. In England we select the fairest roots and the best form for seed, rejecting all such as are of a whitish color or greenish towards the neck, preferring such as are of a *redish cast*. These when selected should be carefully preserved over the winter, and set in the month of March or April, in a rich soil, remote from any roots of the turnip or cabbage kind, to preserve the seed pure and unmixed. Two or three roots if they do well, will yield seed sufficient for an acre of land. Let the seed remain in pods until the time of sowing.

Time of sowing.—The time of sowing may be from the 25th of June to the 16th of July, as circumstances may be.

Quality and preparation of the land.—As a fine, rich garden mould of great depth and having a porous substratum is best for every thing that vegetates except plants that live best in water, so it is best with ruta baga. I know of no soil in the United States, upon which this root may not be cultivated with the greatest facility, excepting a *pure sand* and a *stiff clay*, which are very rare in this country.

Manner of sowing.—My ploughman puts the ground up in little ridges, having two furrows on each side of the ridge, so that each ridge consists of four furrows, and the tops of the ridges were about four feet from each other; and as the ploughing was performed to a great depth, there was of course a very deep gutter between every two ridges.

I took care to have the manure placed so as to be under the middle of each ridge, that is to say, just beneath where my seed was to come, which was sown principally in this manner:—A man went along by the sides of each ridge, and put down two or three seeds in places ten or twelve inches distance from each other, just drawing a little earth over and pressing it lightly upon the seed, in order to make it vegetate quickly, before the earth became too dry. In this method four pounds of seed sowed seven acres. Two men sowed the whole seven acres in two days.

After culture.—When the plants were fairly up, we went with a small hoe, and took out all but one in each ten or twelve inches, and thus left them to stand single. We next went with a hoe, and hoed the tops of the ridges about six inches wide on each side of the rows of plants, and then horse hoed between the rows, with a common horse plough, after the manner of tilling Indian corn, or potatoes, by first turning the earth from the plants, and next towards the plants at the second hoeing. There is no ground lost in these wide intervals, for the lateral roots of the large turnip, as well as the ruta baga will extend six feet from the ball of the plant; and my crop of thirty three tons, or thirteen hundred and twenty bushels to the acre, taking the whole field together, had the same intervals; and less than this, as was practiced by my neighbors, always diminished the crop. Wide as the intervals were, the leaves of some of the plants would nearly meet across the rows, and I have had them frequently meet in England.

EFFECTS OF DRAWING, ROLLING, ANNEALING, &C., OF THE METALS.

In a paper on the ductility and malleability of certain metals, and on the variations of density which they undergo by different operations, M. Baudrimont developes the following interesting facts.

At a temperature rather above a cherry red, iron wire remained three months, surrounded by charcoal, without cementation taking place. A white heat, in five minutes, gave the properties of cast iron to a square bar of malleable iron, of four-tenths of an inch on a side.

Wires of copper, and of alloys of copper and zinc, are increased in diameter, and diminished in density, by annealing. The operation of rolling condenses the metals more than that of wire drawing. The density of iron and copper is greater, if the metals are heated before being passed through the rollers. The reverse is the case with alloys of copper and zinc. The density of the metals is greatest when drawn into very fine wires.

Wires may be increased in length in two ways, by a diminution in the area of their cross section, or by increasing the distances between their particles. When wires are lengthened in the manner last named, they return to their former length by annealing.

Hydrogen has an action on copper and silver, at high temperatures, which permanently separates their particles. On alloys of copper and zinc, and even of silver and copper, it has no such action.

Wires of different metals, which, after passing through the same hole in the wire drawing plate, have different diameters, acquire equal diameters by annealing.

The diameter of a wire increases, very slowly, by time, after passing through the wire drawing plate. Wires which have been bent, and then straightened, re-acquire a curvature.

Wires exposed to a high heat, lose a part of their tenacity. They require to be annealed in wire drawing, not to render them more tenacious, but to allow the particles to resume the positions from which they may again be displaced. The loss of tenacity is common to copper, iron, platinum, and the alloys of copper and zinc.

Brass wire approaches to iron in strength, while copper is inferior to it. Brass may be used instead of iron, where the latter would oxidate too rapidly.

The iron wires are given at strengths from 79,000 lbs. to the square inch to 127,600 lbs. The brass wires, from 78 to 87,000 lbs. to square inch. Copper, from 38 to 44,000 lbs. The diameters of the least and greatest wires were, iron, .014 inch, and .205 inch; brass, .070 and .267 inch; copper, .019 and .285 inch.

The finer wires bear greater weights, in proportion to their areas, than the coarser ones, because the particles of the former are compacted through the whole cross section, while those of the latter, for a certain depth only, are thus forced together.—[Ann. de Chim. et de Phys.]

A short Remark or two on what is commonly called Dry Rot, by Chas. Waterton, Esq.

Dry rot is a misnomer. This disease in timber ought to be designated a decomposition of wood by its own internal juices, which have become vitiated for want of a free circulation of air.

If you rear a piece of timber, newly cut down, in an upright position in the open air,

it will last for ages. Put another piece of the same tree into a ship, or into a house, where there is no access to the fresh air, and ere long it will be decomposed.

But should you have painted the piece of wood which you placed in an upright position, it will not last long; because, the paint having stopped up its pores the incarcerated juices have become vitiated, and have caused the wood to rot. Nine times in ten, wood is paint d too soon. The upright unpainted posts, in the houses of our ancestors, though exposed to the heats of of summer, and the blasts of winter, have lasted for centuries; because the pores of the wood were not closed by any external application of tar or paint; and thus the juices had an opportunity of drying up gradually.

In 1827, on making some alterations in a passage, I put down and painted a new plinth, made of the best, and apparently, well-seasoned foreign deal. The stone wall was faced with wood and laths; and the plaster was so well worked to the plinth, that it might be said to have been air-tight. In about four months, a yellow fungus was perceived to ooze out between the bottom of the plinth and the flags; and on taking up the plinth, both it and the laths, and the ends of the upright pieces of wood to which the laths had been nailed, were found in as complete a state of decomposition as though they had been buried in a hot-bed. Part of these materials exhibited the appearance of what is usually called dry-rot; and part was still moist, with fungus on it, sending forth a very disagreeable odour. A new plinth was immediately put down; and holes, 1½ inches in diameter, at every yard, were bored through it. This admitted a free circulation of air; and to this day the wood is as sound and good as the day on which it was first put down. The same year I reared up, in the end of a neglected and notoriously damp barn, a lot of newly felled larch poles; and I placed another lot of larch poles against the wall on the outside of the same barn. These are now good and well seasoned: those within became tainted the first year, with what is called dry rot, and were used for fire-wood.

If, then, you admit a free circulation of air to the timber which is used in a house (no difficult matter) and abstain from painting that timber till it be perfectly seasoned, you will never suffer from what is called dry rot. And if the naval architect, by means of air-holes in the gunwale of a vessel (which might might be closed in bad weather), could admit a free circulation of air to the timbers; and if, he could, also, abstain, from painting, or doing with turpentine, &c., the outer parts of the vessel, till the wood had become sufficiently seasoned, he would not have to complain of dry rot. I am of opinion, that if a vessel were to make three or four voyages before it is painted, or done with turpentine, &c., its outer wood would suffer much less from the influence of the weather, than it usually suffers from its own internal juices, which cannot get vent, on account of artificial applications to the pores. But still the timber would be subject to the depredation of the insect. To prevent this effectually, Mr. Kayan's process must absolutely be adopted; and it must also be adopted to secure wood from what is called the dry rot, in places where a free circulation of air cannot be introduced. I consider Mr. Kyan's process perfectly unexceptionable.—The long arrows which the Indians use in Guiana are very subject to be eaten by the worm. In 1812, I applied the solution of corrosive sublimate to a large quantity of these arrows. At this hour they are perfectly sound, and show no appearance that the worm has ever tried to feed upon them.

I have penned down these transient remarks by way of preface to others, which I may possibly write, at some future time, on decay in living trees.—[Loudon's Architect. Mag.]

New Spirit Lamp.—A new and convenient spirit lamp, with an eolipyle having a vertical jet, is described by M. Pelletan, the invention of M. Breuzin, of Paris.—The entire apparatus is placed on a neat tripod stand, arranged for holding the vessel to be heated. The wick of the lamp is hollow, and is raised or depressed by a screw and rack. Above the lamp is an eolipyle of cylindrical shape, through the middle of which the flame of the lamp passes. The vessel to be heated being placed above the eolipyle, retains the full effect of the flame of the lamp. The jet pipe from the eolipyle passes downwards, and by a bend is introduced into the axis of the cylindrical wick of the lamp. The alcohol flame is thus entirely vertical, and the apparatus is much more convenient than the common eolipyle where the jet is horizontal. By using vessels properly arranged to economise heat, a pint of water may be boiled in five minutes, and at a cost of less than half a cent (at Paris). In a common coffee biggin, the same quantity of water may be boiled for about a cent.—[Jour. Connaiss. Us. et Prat.]

Application of Tannate of Gelatin to taking Casts from Medals, &c.—This substance is obtained by adding a decoction of gall nuts, sumac, oak bark, or other substance containing tannin, to a solution of glue or isinglass, in water. It is fibrous and nearly insoluble. When exposed to the air in thin layers, it hardens. When moist, it is elastic.

The substance which was found to give the best mixture for casts, was finely pulverized slate. Silica, emery, &c. give pastes which harden, and may be used for razor straps.

In making casts of the mixture of tannate of gelatin and pulverized slate, it must be left for a certain time in the mould, in order to preserve the impression. If, however, it is allowed to remain there too long, it adheres strongly. The only difficulty in the application is to ascertain the precise time required for due hardening.

This substance may replace bronze in ornaments, papier mache, card work, &c.—[Ibid.]

Analysis of two varieties of Bronze.—These specimens were analyzed by M. Berthier. The first was intended for the manufacture of cannon, but proved of bad quality; its composition was ascertained to avoid the same proportions in other mixtures. It consisted in 100 parts, of copper 83.8, tin 15.7, lead 0.5.

The bronze used at Paris for the striking parts of clocks, was found to be composed in 100 parts, of 71 to 72 of copper, 26.56 to 27 of tin, 1.44 to 2 of iron.—[Ann. des Mines, vol. VII.]

Sheathing of Ships with Bronze.—The sheathing of this metal has been found by experiment, to lose but half the weight, in a given time, which copper would have lost. The composition used for making sheet bronze is 91 of copper and 9 of tin.—[Ibid.]

Durability of Acacia Wood.—It was found that in the mining galleries at Carmaux, (France) the oak timber used to support the sides and top of the galleries, decayed very rapidly, being effected by the dry rot. A comparative experiment was made with acacia wood, from which it resulted that the latter wood is much more durable than the former, when exposed in such situation. Oak timber decayed in three months, while the acacia was unacted upon, except at the sap-wood surface, four years.

The lateral strength of this wood is about equal to that of Norway pine.—[Ann. des Mines, vol. VII.]

From the American Journal of Science and Arts.

ACCOUNT OF AN AURORA BOREALIS, WITH A NOTICE OF A SOLAR PHENOMENON; BY CAPT. R. H. BONNYCASTLE, R. EN., TORONTO, UP. CANADA.

I. *Aurora Borealis.*

Having witnessed from the days of my boyhood, the splendid phenomena of the Boreal Aurora, in almost all the latitutudes under which it is usually seen, as far north as to have observed the sun at midnight, and particularly during a long sojourn in Shetland, where the people imagine, from its extremely swift changes and inexpressible vividness, that they can actually hear its rushings, I have ever been anxious to seize all opportunities of endeavoring to catch its Protean forms, and to describe them, in hopes that by exciting attention to facts concerning this wonder of northern skies, science might be more attentive to its appearances, and that at length it might become a portion of the duty of meteorologists to detail in their columns, all circumstances concerning it, which they might observe.

The Aurora in the high northern latitudes, when at its extreme, is almost dazzling, and the quickness of its motions approaches that of lightning. In other situations, it has also been observed to assume irised colors. But although all these combined are eminently wonderful, and strike the spectator with profound admiration and awe, yet perhaps the regions of Upper Canada, bordering on Lake Ontario,* exhibit, though not so splendid and varied a display of this mystery, yet one equally, or

* Not having observed it elsewhere in Canada, I speak only of locality as a personal observer.

perhaps more, interesting to the philosopher. I have now witnessed the Aurora at Kingston for upwards of four years, and in a former volume of the Transactions, have described a magnificent scene, which occurred there two years ago.

During the winter months, on Lake Ontario, the Aurora may be said to be almost constant companion of the dark and cheerless nights, and it occasionally presents itself at all other times of the year, nor is it in winter a mere display of a glorious phenomenon, the utility of which has not yet been exemplified by science, for it sheds a continued and pleasing light, which resembles that of the crepuscular. The light does not, as in Europe, emanate from the vivid streamers which dance over the starry floor of the heavens, in ever changing and inexplicable mazes, but proceeds from the northern horizon, over which a pale, luminous, low, and depressed arch, embracing an extent of from sixty to ninety degrees, is commonly thrown. This arch is generally luminous in its whole body, not on the rim or verge only, which fades away into ethereal space, but from its superior circumference to the chord formed by the horizon itself, and varies in its elevation, from ten to fifteen and twenty degrees. Wherever it embraces stars, these luminaries are either veiled or dimly seen, being strongly contrasted on a fine star light night, with their fellow orbs of the southern heavens, which appear to shine out with double brilliancy.

Within the space comprehended by this arch of light, continual changes are operating, if the Aurora assumes a splendid shape. Dark volumes of vapor, not like clouds, but blackening in a moment, rise and fall, whenever a ray or an interior arc begins to form, and it is remarkable, that this darkness usually accompanies the commencement of every change in the scene, thereby increasing the majesty and beauty, as well as the brilliancy of the spectacle.

But it is impossible for any pen adequately to describe a phenomenon, which is continually presented in these regions, and it is with diffidence that I continue a task imposed on myself. It will, therefore, be more satisfactory to detail the circumstances attending a very recent repetition of one of the most beautiful of those which have been seen at Kingston this winter, nearly the whole of which I saw, and whatever escaped me was related by a very accurate observer.

On the evening of the 11th of December, 1835, the sky, after the sun had sunk, was dark and gloomy, and although there were but few clouds visible, and the stars were rapidly brightening, a change of weather was apparent. Snow had fallen, for the first time, on Wednesday, the 8th, after a short space of great cold, to the depth of about five inches, and the thermometer had sunk afterwards to 16°, at which it stood on Monday, the 13th. On Tuesday, it rose to 30°, and rain in abundance falling, removed the snow entirely. It was exactly midway between the extreme cold and the thaw, that the Aurora took place, the thermometer at the time standing at about 26°, and the wind, a gentle breeze from the north west. The barometer stood at 29.9, at 9 P. M., at an elevation of forty feet above the lake, which is two hundred and nineteen feet above the level of the sea.*

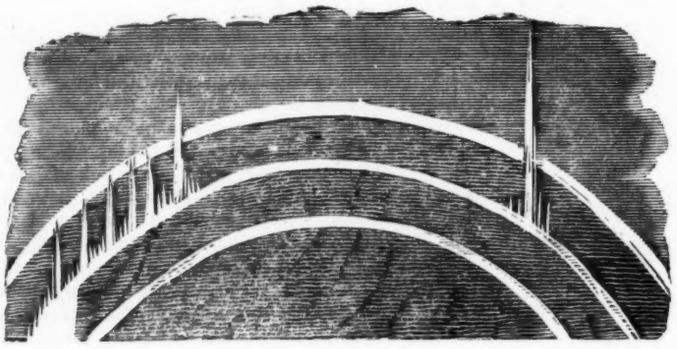
Its first appearance, after darkness had completely set in, was by the luminous arch above mentioned assuming its wonted place. From this arch, in the north, arose almost incessant streamers of bright white light, which shot upwards to the zenith, and streaked the dark sky with their silvery lines.

* The barometrical observations were made at the Hospital on Point Henry, by a very accurate observer. On the 10th December, it indicated, at 9 A. M. 29.5, at 9 P. M. 29.7; on the 11th, at 9 A. M. 29.8, at 9 P. M. 29.9; on the 12th, at 9 A. M. 30.1, at 9 P. M. 30.1.

Once a mass of light suddenly opened in the zenith, and from it darted out innumerable pencils of bright rays, overspreading the dark vault of heaven with their glories, and seeming for a moment to illuminate the sky with a star which its vast space was scarcely capable of containing.

Again, rods of white light would dart forth from the northern horizon, and one single one, in particular, spanned the whole arch of heaven, touching the southern horizon over the great lake.

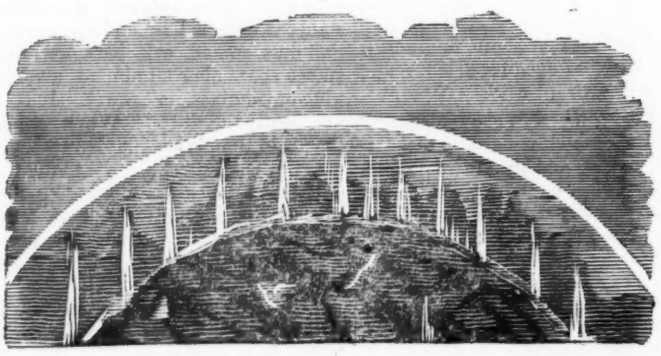
This play of the Aurora continued from seven till near nine, and was most brilliant and magnificent about nine, when it assumed another and not less singular attitude, of which the following is a faint attempt to delineate.



These arches are not so flat as they should be, but the space is insufficient to show them exactly. The lower one was usually the boundary of a very dark black, changing mass; between the lower arch and the second, the space was not so dark; and between the second and third, or upper arch, it was still lighter, excepting where the coruscations shot upwards out of the second arch, and there it was very dark. The second arch was incomplete.

The ray shooting up on the right was brilliant in the extreme. Stars were partially visible above the third arch, but the bright ones in Ursa Major, on the left, had lost all their splendor, and the constellation could just be traced. The obscuration of the heavenly bodies reached almost to the zenith, above the centre of the arch, and was less over the extremeties.

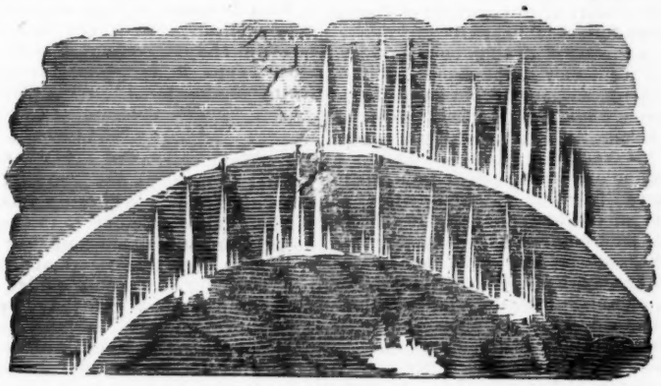
The first appearance lasted long enough for me to go into another part of the house and make a hasty sketch; on my return to the window, it was altering to the following form.



The lower arch had somewhat heightened and become darker, with here and there spots of light in it, whilst from its circumference shot out brilliant rays and pencils of light. The second arch had altogether disappeared, but the upper one held its wonted place. It must be observed, that the upper arch was always paler, and more indistinct in its outline than the others. Faint stars now appeared through the darkish vapor, between the two bands or arches of light, and the lower band was indistinct, excepting to the left of its central space, where it was vividly depicted and extremely well defined, by a sharp band of bright light, cut off, both above and below, by very black vapory masses. This second appearance lasted, also, long enough to enable me to make a hasty sketch of it.

None of the pencils or rays, which soth out of either of the changes of the Aurora, were so quick or so intensely vivid in their action or light, as those seen in the more northern regions, nor were they colored; but they were always accompanied by the black vapory shroud, which hid every thing else from view, and added greatly to the lustre of their exodus from the horizon.

Having made the foregoing sketch, I again returned to view the Aurora, which had somewhat changed its appearance.

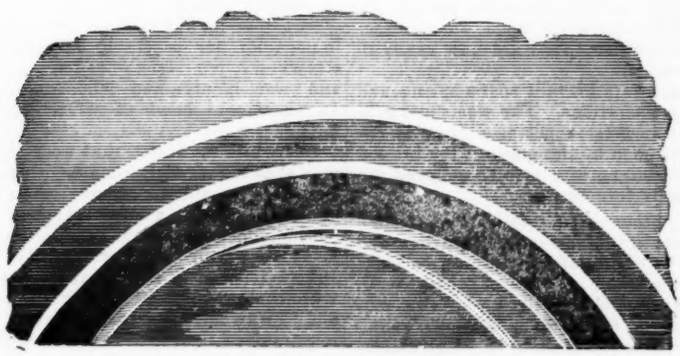


Both arcs or belts were now less distinct, the lower one almost obliterated, but still its place was well marked by the arch of vapor below, which was darker than ever. Three large spots of intense light now displayed themselves, one on the horizontal chord, and one an each side of the lower arch, whilst this lower zone shot out innumerable pencils and floods of light from its dark nucleus, the upper zone also darting forth long lines of brilliant rays; all these rays from both hands, moving in a very statelymarch or progression from east to west.

Towards the southern and western portions of the heavens, all was clear blue-black starlight, Orion being particularly brilliant; the north was as if overspread with a thin veil, through which the stars were barely visible.

I watched these alterations of the phenomenon until after ten; and the last I observed presented this form; after which the arches became less distinct, and eventually, with the exception of the great arch, passed away.

In this fourth change the Aurora, it will be observed, resumed its three arches, but they were no longer concentric, the third being broken on the right into a portion of a fourth. Between the second and third the darkness was the darkness of blackness, whilst the third arch was light itself; but the lower arches were not so bright, and the lower nucleus was only darkish, which was contrary to every state that it had presented, under any former observations for several years.



The constant arch of the Aurora of the Lakes has, I believe, never been noticed in any scientific publication, as is well worthy the attention of the learned. Whether it is created by a peculiar locality of the matter, of which the substance of the Aurora is composed, or whether the Aurora itself, as the magnetic influence, has a peculiar pole from whence its effluences emanate, can scarcely be, at present, determined; but it is at all events highly singular, that in a latitude so low as 44°, the Aurora should assume forms, unknown in the higher northern regions where its powers were hitherto supposed to have developed themselves in the highest possible state.

Not having been very well when this singular scene occurred, I did not take all that notice of it which it deserved. I trust I shall be able during the winter to note the atmospheric phenomena which accompany it, more particularly, as well as to give more detailed accounts, and more perfect drawings.

II. *Solar Phenomenon.*

Immediately previous to the alteration of the weather at Kingston on Lake Ontario, after an unusual duration of severe frost, and about the middle of March, at near four o'clock in the afternoon of Sunday, I observed a singular species of halo or rainbow.

The day was mild, and there was scarcely any wind, and no rain, but the face of the sky was overclouded, and the sun appeared as it does through a slight fog.

Around the luminary, at a radial distance of perhaps twenty degrees, there was a dark halo of the usual defined character and appearance; and circling this halo in various places, a rainbow was visible. This rainbow was brightest in the eastern and western parts of the halo, where it assumed that peculiar appearance which seafaring men call weather dogs, and which are of very frequent occurrence in the northern division of the Atlantic ocean.

It was evident from the dull whitish light, that was diffused about those portions of the circumference of the halo on which the prismatic colors were not perfectly defined, that, in some situations, an observer might witness the singularly interesting spectacle of a circum-solar rainbow, in which the prismatic colors formed a complete circle, concentric with the sun.

In the course of the winter season, during changes of the weather from frost to a thaw, I have frequently observed a small portion of a vertical arch of the above description, although the sun was hardly visible. Usually these occurrences have taken place when the sun has been at the same elevation, as in the instance here described. They have always happened when there was no rain.

I am unable to say whether the appearances might not be created by reflection from the brilliant surface of such a vast body of ice, unincumbered by snow, as has been presented by Lake Ontario during the last winter, as it is difficult to account for the formation of a rainbow of so small a diameter on the usual principles, since the sun at the time was forty degrees above the horizon.

I have used the word rainbow in the above description, although it is not a correct one, as there were no appearances of rain during the presence of the phenomenon, although it is true there was a slight mist or fog.

Since writing the above, I have seen an almost complete circum-solar rainbow, which appeared at Toronto, (U. C.) July, 1834, at 7 in the morning.

From the Mechanics' Magazine.

STEAM, *versus* WATER.

Few persons even in this age of inquiry and improvement seem to be aware of the vast superiority of steam over every other form of motive power. Many are still, by this assertion, reminded of the anecdote of the famous Brindley. In giving evidence before a Committee of the House of Commons on the subject of Canals, he spoke of their superiority as a mode of communication in such decided terms, that a member asked for what he thought rivers were intended? he unhesitatingly replied, "*to feed canals.*" Now, though we say that the manufacturer will one day "feed his boiler from the falls," we think that the assertion is not a bold one, and that it does admit of proof.

Some time ago, our attention was directed to a comparison of the expense of the two forms of power in the village of Lowell, possessed of the best water power in the Union. The expense of Steam to Water was said to be as 100 to 125.

We have since often had this subject in mind, in reference to the more improved use of steam, and particularly to the economy of the rotary engine of Avery.

Pursuing the comparison, we have collected some of the more prominent disadvantages of the usual hydraulic system, and the corresponding advantage of steam power.

The first item of cost is that of the water right, over and above the value of the ground as increased by any other advantages of locality. This expense is in no case trifling, and sometimes is positively enormous. There is of course no corresponding item of expenditure in the use of steam, an engine working as well on the top of a hill as in the bottom of a valley.

2d. The outlay upon wheels, dams, and other hydraulic works. This is often much greater than would be necessary for the average pressure, provided it were constant—that is, we are to erect works to support much more water than we have supplied through three quarters of the year. Freshets, &c. are to be provided against, at an increased cost. It is well known that in some locations the provision for such contingencies is no small portion of the whole capital employed.

It is this expense, other things being equal, that is to be compared with the cost of an engine, and the comparison is favorable to the latter.

3d. After every precaution, damages from floods are of constant occurrence, and thire repair is exceedingly costly.

4th. The delay caused by freshets, &c., producing a stoppage from the too great supply of power.

5th. The delay in seasons of drought, when the supply is insufficient.

These last are most vexatious occurrences, preventing work often times when most is to be done, and the uncertainty arising from the possibility of such delays and accidents, is a constant care to the manager of such an establishment, whereas to the consumer of steam, the perfect certainty of the amount and regularity of the supply of power is a great auxiliary in conducting business.

For a steam engine, the only use of water is a sufficiency for the boiler; and in these days of economy of heat and steam, a very small quantity of fuel is used, and but little water. We have seen a rotary engine, estimated at 15 horse power, evaporating but 40 gallons per hour.

6th. Delay in winter, and in our uncertain climate this may sometimes be considerable, and in an establishment of great extent perhaps fatal.

To balance all these expenses, peculiar to the use of hydraulic power, there is, as far as we can recollect, but one peculiar to that of steam, namely, *fuel*. Now in saw mills this expense is nothing, and in all instances much less than formerly.

Our persevering countryman, Dr. Nott, has already succeeded in greatly reducing this item of cost—and he does not yet appear to be satisfied.

As regards fuel, Avery's Engine has immense advantages over others, inasmuch as the quantity of water used is less than in any other case. The elasticity of the steam operates more advantageously than in any other construction, the small quantity of water used being a proof of this.

In the engine above referred to, the cost for coal was rather less than $1 for ten hours.

It is almost needless to observe that, in many large establishments, manufactories, &c., the application of a portion of the steam to heating, &c., nearly, if not quite, compensates the cost of fuel. The certainty and uniformity of this method of drying goods, have fully established its superiority. Indeed, in the art of dyeing, certain colors owe their brilliancy to the rapid and high heat of steam, and they could be produced in no other way. While speaking of this use of steam, we must notice an engine erected in the ASTOR HOTEL. This is a small engine of 5 horse power; its use is to pump water from the different cisterns to all parts of the house—supply the baths with hot and cold water—clean knives—brush shoes—roast and grind coffee; and the steam cooks the various dishes in the kitchen, and also dries the clothes, which by this method of proceeding are ready for use with unprecedented despatch.

To these and numberless other uses is this engine turned, saving an immense number of servants, a great quantity of fuel, and a vast deal of time.

(The exhaust steam pipe of this engine is over 300 feet long.)

One of the greatest advantages of steam power, in many cases, is, that it admits of change of locality, without injury to the machinery, and often with benefit to the employer.

In this respect again Avery's Engine stands pre-eminent. The machinery is beautifully compact, and consequently portable. An engine of 15 horse power is hardly a load for a horse, the whole weighing less than 600 pounds.

Let us suppose, that a man purchases a piece of timber land, of prime quality, but unfortunately (as is thought) away from any water course.

Let him procure an Avery's Engine; and this, connected with his saw mill, can be placed upon wheels and moved, by the engine itself, if he pleases, to any part of his land. (Mills capable of such an arrangement, and very compact, are now easily to to be procured.)

Let him locate his mill near a spring, and commence operations. The waste and rubbish, that in most cases is a drug, is entirely consumed by the engine; the ground is cleared, and nothing is to be removed but the perfectly formed timber.

Among other useful applications of such an engine, in the forest itself, no one can be equal in beauty of operation to the valuable *stave machine* of Philip Cornell, N. Y. (A drawing and description of this machine will be found upon the next page.) This machine promises to be of great service. With such an arrangement as that of the saw mill above mentioned, nearly is not quite double the usual number of staves can be cut from the timber before transportation, and these are already dressed and ready for use, either for liquids or solids.

These are only a few of the very many useful applications of this sort of traveling machines. Others will suggest themselves to our readers.

It must be very evident that, whatever brings into use property of little or no value, enabling the produce of such land to compete successfully with that of much better, must add to the wealth of the landholder, or timber merchant, a sum equal to the cost of the best land.

Thus a greater uniformity of value would result, and of consequence a more equal competency to those on or away from great water courses and canals.

Our object is to draw attention to this question, and we should be much gratified if any of our friends would furnish us with such information on the subject as they may have at their command.

This information from various quarters when collected, might furnish results equally useful and interesting—and we shall feel most happy in becoming the medium of their communication to the public.

From the Silk Culturist.

CULTURE OF THE STRAWBERRY.

After so much as has been said and done to induce farmers to devote a small portion of their land and labor to the purposes of horticulture, it is astonishing they should be willing to deny themselves and their families the luxuries which a garden and fruit yard furnish, and be content to set down to a meal of "pot luck," at least three hundred and sixty-five times in the year. If a farmer would be a "good liver," his garden must furnish his wife the "wherewith," or he must not complain if she sets a poor dinner before him. If he loves cherry puddings, he must set out cherry trees before finding fault with his wife for not making them—if he is fond of quince, currants or gooseberry preserves, his wife will be delighted to put them on the table; but it is to be hoped he will be good natured if she does not, if there is nothing but pig weeds and potato tops in the garden from which she can gather them.

Among the numerous kinds of fruits which are indispensible to good living is the strawberry. Besides being a most delicious dessert fruit, it is considered by medical men as valuable medicine in several diseases—particularly putrid fevers and pulmonary consumptions. A free use of strawberries, it is said, will both prevent and cure the rheumatism. Every farmer's wife ought to consider her dinner table incompletely furnished, for at least four weeks in the heat of summer unless it has upon it a dessert of strawberries and cream. She ought also to consider her tea table deficient unless strawberry jam is among her preserves and sweet-meats—and who does not love an occasional bowl of strawberries and milk?

But while we insist that every farmer's wife should furnish her table with delicious fruit, we would not compel her, or her daughters, to "go a strawberrying" in the old fashioned way their grandmothers did. Even they were so extravagantly fond of strawberries as to ramble about the fields, with their "sun bonnets" on their heads, and "strawberry baskets" in their hands, in pursuit of them. If farmers would have strawberries they must devote a small portion of their gardens to their cultivation. There are several varieties of excellent flavor, and by a judicious selection, and a little labor, a full supply may be had through the season. The ordinary method of cultivation is to prepare the ground, by manuring and spading, and transplant in August. The distance between the plants from nine to fifteen inches, according to the varieties. The runners the first year are cut off before they take root. Some cultivators cut off their leaves in autumn. The second year the runners are permitted to take their course—filling up spaces between the plants and producing ordinarily, a good crop of large sized strawberries. Some lay down straw or grass for the runners to run upon. The utility of this is manifest in many respects, but especially in keeping the fruit

from coming in contact with the earth, by which it would be injured by dirt. After the fruit is gathered the straw should be removed and the plants cleared of weeds. They should be transplanted every second year.

The town of Portsmouth has authorised the superintendent of the Town Farm under the direction of the Selectmen, to commence a nursery of white and Chinese mulberry trees upon the farm.

From the New-England Farmer.

INDIAN CORN MADE WITHOUT TILLAGE AFTER PLANTING.

By experiment, I have arrived at some conclusions in regard to the culture of Indian corn, which I think are of importance to planters in the Southern States. I communicate them for the use of the public with great hesitation, because they are directly at variance with the received opinions on the subject.

The early part of my life was spent in agricultural pursuits—and hence, if there were no other reason, I feel a deep interest in every thing relating to agriculture. I noticed, very early, the great difficulty in transplanting successfully the young corn plants. Whence comes this, but from breaking the roots in taking the plant up? How is it then that intelligent planters affirm the doctrine, that one chief object of ploughing corn, is to cut its roots? If breaking the roots of young corn in transplanting it, is really fatal to its future growth, must not breaking its roots with the plough, when it is older, and the season hotter be a serious injury to it? Any other conclusion seems to me to be at variance with the general economy of nature. It seems to me that there can be in truth, but two reasons for ploughing or hoeing corn—1st, to destroy grass and weeds; and 2d, to keep the soil loose, that the roots may penetrate easily, in search of their proper food. But in accomplishing these two purposes, great injury must be done to the corn, by breaking its roots. Can we not accomplish both these ends, and at the same time keep clear of the attendant mischief? I think we can.

Last spring I planted a small piece of poor ground—first breaking it up well. The rows were made three feet apart, and the stalks left about a foot apart in the drill. The ground had been very foul last year with crab grass, whose seed matured. The corn was not well up this spring before the grass began to appear. When the corn had about four or five blades, the young grass completely covered the ground, and the corn was turning yellow. I spread a small quantity of stable manure around the corn, and covered the whole ground three or four inches deep with leaves from the forest, taking care to do this, when the ground was wet, and the leaves also, that they might not be blown away, and to leave the tops of the young corn uncovered. In *ten days* there was not a particle of living grass to be found, and the corn had put on that deep bluish green which always betokens a healthful condition of the plant.

From the day the corn was planted until after the fodder was pulled, and the tops cut, nothing was done with it, and the result is a product at the rate of forty-two bushels to the acre—about one-third of the stalks having two ears on each of them.

I noted, in the course of the summer, the following facts:—

1st. The corn created thus, was always ahead of some planted along side of it, and treated in the usual way.

2d. It ripened at least ten days sooner than other corn, planted at the same time.

3d. During the hottest and dryest days the blades never twisted up, as did other corn in the neighborhood.

4th. In the dryest weather, on removing the leaves, the ground was found to be moist to the surface, and loose, as deep as it has been at first broken up.

5th. The heaviest rain had scarcely any effect in washing away the soil, or making it hard.

It certainly will require less labor to produce corn in this way, than in the usual mode. And even if it required more, we have the consolation to know, that while, by the old mode, every hour's work is an injury to the land, by this mode, every hour's work is making the land better; for few things can be better manure than the coating of leaves put on in summer, when ploughed in the winter and spring following.

I used leaves raked up in the forest, because of these there is an ample supply within the reach of almost every person, and beca use there seems, from my observation, tobe a strong antipathy between dead, and decaying forest leaves, and crab grass, that most harassing foe of agriculturists.

I make this communication, as I have already said, with hesitation, because the idea of raising corn without ploughing and hoeing, and at the same time improving the land, by protecting it against the influence of a scorching sun and washing rains, is so directly in the teeth of the universal practice for ages. The thing is, however, at least, worthy of further trial. It may lead to most important results.

Those who think the plan worth any attention, may easily make an experiment with an acre or two, and note carefullythe progress through the summer. If they are satisfied, after the trial, that there is any thing in it, to extend the operation will nor be a difficult matter.

If, on experiment, it should be found advisable to extend the operation, the proper way would be, I think, to collect the leaves in winter, and deposite them in heaps on the ground on which they are to be used, and the next spring during a wet season, after the corn is up, spread them, taking care to leave the tops of the young corn uncovered.

There is one very important result that must follow the success of this plan on a large scale—and it was with an eye chiefly to that result, that my experiment was undertaken. The constant excuse for not improving our land, is, that where cotton is grown, the time necessary, first to cultivate the growing crop properly—next to gather it, and then to prepare for a new crop, leaves the planter nr time to collect manure. My plan will be to put an end to that excuse at once; jor where leaves are to be had, half the time usually bestowed on working the corn crop in the usual way, spent in gathering leaves and putting them on the ground, nstead of ploughing it, may in a short time accomplish every thing that can be desired in the way of manuring.

Why may not the same process answer in the cultivation of cotton? If it keeps the the ground soft and moist, and prevents the growth of grass and weeds in a corn crop, it will surely have the same effect with cotton—and be the means, further, of preserving the cotton, when the bolls open, from all the injury it sustains from the soil in wet seasons. This is, however, but speculation. Let it be tested by actual experiment.

JAMES CAMAK.

Athens, Ga. October 10, 1835.

From the Genesee Farmer.

WHEAT.

The season is now so far advanced that a tolerable conjecture may be formed as to the state of the wheat crop, and the effect produced upon it by the past winter. From our limited observation, and from what we have been able to learn from various authentic sources it appears that in what is called Western N. York, which is emphatically the wheat district of the state, the wheat has suffered to an extent quite equal to what was at first apprehended. The western counties extending to Wayne and Seneca may expect a medium crop—in Wayne, Seneca and Cayuga counties there is much wheat that promises well, but as a whole, it has been a good deal thinned, and many pieces entirely destroyed—while farther east, in Onondaga, Oswego, Madison and Oneida counties, the wheat has suffered still more extensively. In the most favorable sections of Onondaga, where the crops have rarely if ever failed, but few first rate pieces are to be seen; while in the less favorable sections hundreds of acres have been totally destroyed, and have been ploughed up for spring crops. The same remarks, but in a greater extent, are applicable to Madison and Oneida.

Wheat in our winters suffers from two causes, extra warmth, and extra cold. The first is generally produced by a covering of snow to such a depth as to exclude the action of the atmosphere on the earth, take the frost from the ground, and by thus producing an unnatural and premature effort at vegetation, causes the death of such imperfectly rooted plants as wheat and rye; but which under favorable circumstances remain with their leaves green through the winter, and are consequently ready for the first exciting impulses of vegetable life.—Such plant differs materially from those in which the leaf perishes, and only the root retains its vegetative power; in wheat this power in the leaf is only suspended, it is not destroyed, and approaches to the suspended animation sometimes observed in animals, and occasionally in man. If the vital powers of the plant are called into exercise before the means of renewing the waste caused by the effort can be provided, the plan so excited must perish; and when wheat is smothered by the great body of snow, as it has been the past winter, precisely this effect is produced. Excluded from the external cold by the covering of snow, the internal heat of the earth soon banishes the frost, the root of the plant rouses from its torpor, but the leaf is in an exhausted receiver, it cannot act, the revivifying influence of the air does not reach it, and leaf and root must consequently perish. When the snow vanishes the leaf looks green, but the sun soon makes it white and dry. The other way in which wheat is killed in the winter, is by being frozen out of the earth. Gravelly or sandy soils rarely or never suffer in this way, as the porous earth allows the water to escape and prevents the adhesion of surface, without which the wheat plant cannot be lifted out of the ground. Almost every one has noticed the beautiful columns of frost work, which in low wet spots are formed by the freezing of the water, and gradually lift the loose surface to the height of several inches. Where the clay in the soil is in sufficient quantities, an adhesion of the particles take place; and by freezing, the surface, with the roots of wheat, rye or clover in it, is gradually lifted and drawn upwards. With a little sun this surface thaws and sinks, but the lifted roots do not return to their original position in the soil. The

same operation of freezing the surface and lifting of the plants is again and again repeated, until the tender fibres of the roots, completely drawn from the earth, are themselves frozen, and the plant necessarily perishes. This is the method in which wheat is generally winter-killed, and is frequently witnessed in soils where the clay predominates.

But though the past winter has destroyed much of the wheat; if what remains produces an ordinary yield, there need be no apprehensions of a deficiency of bread stuffs. There is at the present moment a vast amount of wheat in the country of the last year's harvest, greater perhaps than has often been known, and farmers are in every section industriously endeavoring, by an extended culture of the coarser and spring grains, to supply any apprehended deficiency that may arise from the effect of the winter on their wheat fields. G.

From the Maine Farmer.

COMPARATIVE EXPENSE OF RAISING A QUARTER OF AN ACRE, OR ANY GIVEN QUANTITY OF LAND, PLANTED TO RUTA BAGA OR POTATOES.

Mr. Holmes:—The last season, while hoeing my Ruta Baga a farmer called on me. I enquired of him if he raised Ruta Baga? He answered no, and gave as a reason that he could raise as many bushels of potatoes cheaper or with less expense of manual labor than he could the Ruta Baga. His remark caused me to use my arithmetic, which I have uniformly found valuable in much of my business as a farmmer First I prepared my land by ploughing and harrowing and manuring, the same as I should have done for a great crop of potatoes, being one fourth of an acre. I then chained it out 2½ feet asunder, and then by hand sowed my seed in the chain marks not sparingly—a hand followed with a hoe and covered the seed lightly, which took equal to a half day of one man, 50 cts.—seed 25 cts.—Soon after the plants came to any considerable size I hoed over the ground between the rows, which took a day, $1—the second hoeing and trimming took 2½ days labor, $2,50—I had to hoe soon again, or the leaves would have become so large as to have rendered it difficult without injuring them—this took a day, $1—The whole expense on the 4th of an acre, except the manure, ploughing, harrowing and 2 bushels of ashes was $5,25. I do not calculate the ploughing because I leave it out in my comparison in my 4th of an acre of potatoes. Six or seven hundred bushels to the acre is an average crop of Ruta Baga, and about half that quantity of Potatoes—so in proportion for a 4th of an acre or any less or greater quantity of land. Mine yielded more than in that proportion of Ruta Baga.

Now as to the expense of a fourth of an acre of Potatoes. First, the seed cost $2,00

Dropping and covering, 1 day,	1,00
Hoeing once	1,00
Digging is worth, say	1,50
	$5,50

The fourth of an acre yielded 85 bushels, which is after the rate of 320 bushels to the acre. I charged nothing for harvesting the Ruta Baga because the leaves will pay that. All allow that the Ruta Baga crop on rich land will yield double the number of bushels to the acre compared with potatoes. With this in view, which is the most profit? On poor land still I would raise potatoes. A. B.

ELECTRICAL SHOCK FROM A SHEET OF PAPER.

Place an iron japanned tea tray on a dry, clean beaker-glass, then take a sheet of foolscap writing-paper, and hold it close to the fire until all its hygrometic moisture is dissipated, but not so as to scorch it; in this state it is one of the finest electries we have. Hold one end down on a table with the finger and thumb, and give it about a dozen strokes with a large piece of India-rubber from the left to the right, beginning at the top. Now take it up by two of the corners and bring it over the tray, and it will fall down on it like a stone; if one finger be now brought under the tray, a sensible shock will be felt, Now lay a needle on the tray with its point projecting outwards, remove the paper, and a star sign of the negative electricity will be seen; return the paper, and the positive brush will appear, In fact, it forms a very good extemporaneous electrophorus, which will give a spark an inch long, and strong enough to set fire to some combustible bodies, and to exhibit all the electric phenomena not requiring coated surfaces. If four beaker-glasses are placed on the floor, and a book laid on them, a person may stand on them insulated; if he then holds the tray vertically, the paper will adhere strongly to it, and sparks may be drawn from any part of his body, or he may draw sparks from any other person, as the case may be; or he may set fire to some inflammable bodies by touching them with a piece of ice.

I beg to remain,
Yours, &c.
G. DAKIN.

Oxford, March 20, 1836.

We suppose that every one having occasion to clean paper with Indian-rubber during the past winter, has noticed the remarkable force with which the paper adheres to the table.

From the Railroad Jonrnal.

MARBLE CEMENT.

An important improvement, which has been for several years in progress, is about being introduced to the more general notice of the public, and we believe into extensive use for building purposes. It is a composition or cement, of which the principal ingredient is marble or lime stone, which, when applied to the inner or outer walls of buildings, presents the appearance of polished marble, of the various hues and qualities which distinguish the beautiful material imitated. What would be thought of a magician who possessed the power of changing the sombre brick and stone walls of the buildings of a city, in one week, into substances resembling the most beautiful Grecian, Italian, Egyptian or Verd Antique Marble, or porphyry, like the rock of Gibraltar? Yet all this may be done by this invention of a humble citizen, of Orange county, in this State. This cement has been sufficiently tested by experiments on buildings, to satisfy practical men of its decided superiority over any other cement, stucco, or other hard finish for walls, hitherto known. In our next number we expect to be able to furnish the public with some interesting particulars, on this subject; and in the mean time we can state, that a company has been formed, in this city, to carry on the operations connected with the manufacture of this new cement, and its application to buildings. Those who are curious in these matters, may obtain further information in relation to it, by applying at this office, or at the office of Edwin Williams, over Leavitt, Lord & Co., Broadway.

From the Mechanics' Magazine.

The following Questions, which were proposed in a late number of the Mechanics' Magazine, are, in consequence of some mistakes then made in them, again offered for consideration, with some modifications and additions.

QUESTIONS RESPECTING WATER-WHEELS, AND HEATING AND VENTILATING DWELLING HOUSES, OR OTHER BUILDINGS.

Can a stream of water be used to as much advantage, or made to do as much work, upon a horizontal wheel as upon a vertical one; and if so, what is the best construction for one, and what the cost of building it?

Can the same quantity of water that is let, in a thin sheet, upon a vertical wheel, (that is a wheel upon a horizontal shaft,) be made, in any way, to produce the same effect, when let in solid column upon a horizontal wheel, on a vertical shaft?

What have been the results of the experiments upon water wheels, made under the direction of the Franklin Institute, at Philadelphia? What kind of wheel was found best adapted to, or most effective under any given head and fall?

What is the best and most economical mode of heating dwelling-houses, schools, and lecture rooms, factories or other large buildings? By introducing heated air from a furnace—by pipes, heated by steam, carried around the sides of each room, or by similar pipes filled with boiling water?

What is the requisite size of a furnace to heat a room or a house of any given dimensions? What should be the size of the flue, for warm air, for heating the whole house; and what that of the branch flue for each particular room?

What is the best construction for the furnace-pipes, &c. upon the hot air, steam, or hot water plan; and what quantity of fuel (wood or coal) will be consumed per hour, if the fire be kept up, day and night, upon each plan, and what the cost?

What are the requisite dimensions of the furnace, boiler, pipes, &c. to be properly proportioned to the size of the whole building and to each room; and what the whole cost?

Are pipes of hot water, which are used to such advantage in England, sufficient for the purpose in a country where the winters are so intensely cold as ours sometimes are?

D*** F*****.

The following communication is in reply to some queries published in a late number, and now re-published in consequence of several errors in the first publication. The information it furnishes appears to be the result of the observations of a practical man.

We may here remark that some successful observations on heating by steam, are contained in a work, lately received by us, and from which we shall extract much interesting matter on this and other subjects, as soon as we can dispose of the matter already on our hands.

NEW MODES OF HEATING BUILDINGS.

Mr. MINOR:—In No. 38, p. 98, of the Magazine, your correspondent D*** F***** inquires what is the best and most economical mode of heating large buildings. As no one more able has replied to this inquiry, in the succeeding numbers, I venture to trouble you with a few casual observations made by me during a few years residence in London; and to request the publication of them, in case you think them likely to be of sufficient use to warrant their appearance in your valuable work.

All the methods I have seen may be divided into two classes,—those in which water intervenes between the fire and the atmosphere,—and those in which the fire is uncovered, or separated from the atmosphere merely by plates of iron. To the second of these there is a well known objection, that the quality of the air is injured by contact with heated iron, in so great a degree as to cause headache and unpleasant sensations in the eyes and even in the skin generally. By some this is said to be owing to a change in the electric state of the air; by others, to the absorption of oxygen by the heated metal:—the remedy they both propose is, to evaporate water; but it has not been shown to my satisfaction, that this entirely removes the evil, or that it does not introduce a dampness that is not always desirable. Besides, this principal objection, there are frequently gases, dust, smoke, and unpleasant odors, arising from stoves and open fires, and particularly from those complicated and expensive rattle-traps, called air-furnaces. From my own observation, and from the verbal reports of many who have used them, and from all that I have read on the subject, it appears that the first class of contrivances are not liable to injure the air, as the others do, by giving it the power of causing headache &c. by surcharging it with vapor, or dust, gases, or any thing else objectionable;—except that in the case of heating by steam, I have read a statement that it sometimes causes an unpleasant odor; owing, probably to the particular metal of which the pipes are made; for the complaint is not applied generally to this method.

So much for the *quality* of the heat obtained by these different methods:—I will now state what little I know of its cost. An obvious advantage of furnaces, stoves, etc., is, that if t ey are well constructed, you may burn in them almost any kind or quality of fuel, and thereby save the difference between the cheapest and dearest, (supposing, of course, that they are not in your parlors, or exposed to view.) Another advantage is, that you may dispense with the incumbrance of chimnies, and a great deal of expensive ornamental work, amounting, I am told, to a thousand dollars in many houses. But as to the comparative cheapness in respect to fuel of "hot air," "steam," and "hot water," I can only mention a fact reported in the London Journal of Arts and Sciences: that in one case, where hot water was introduced into a house that had previously been heated by hot air, the saving of fuel was one third; but this was not considered a fair test, as the air-furnace had not been well constructed.

At this moment, while I am writing, I have a smoke coming from an air-furnace flue in the corner of my room; by which I am prompted to censure the quackery of the unscientific persons who make these things in such a way that they get filled with dirt, and do not give you a chance to clean them, or remove the oxidised pipe, without pulling down a great quantity of brick-work. The one I have, though economical in respect to fuel, is a nuisance in all other respects, and was still worse before I made a better arrangement of the smoke-pipe, which the stupid constructor had run, after an ascent of two and a half feet, horizontally, for eighteen feet, to its insertion into the kitchen chimney, the large fire-place of which was open immediately under it. Though I consider it for the general good, and therefore for every man's particular interest, to be rather gentle in censuring the well intended blunders of half-ingenious, and wholly unlearned men, yet the number of these nuisances, so expensive at first, and so liable to get out of order, and so difficult to repair, is so rapidly increasing, that I feel bound to give my feeble evidence against all that I have ever seen of them. The fundamental principle on which they are made, is good; but in their construction all simplicity is eschewed, as if complication and multitude of parts were a proof of genius, and not strong presumptive evidence of the want of it. The only arrangement on this principle that I remember to have seen, that is free from the objections just enumerated, was a simple stove, (Dr. Nott's, I believe,) placed in a fire-proof closet about four feet square, with a door of sufficient size to admit a person, in the top of which were perforations, through which the heated air passed to the rooms above.

As to the original cost of hot water and steam apparatus, and the quantity of heating surface necessary in each, I am not able to say much. It is stated in the "Encyclopedia Americana" that one square foot of steam-pipe has been found sufficient to heat two hundred cubic feet of air; but this may have been for the English climate. In Perkins' hot water, called the "high pressure" apparatus, rolled iron pipes are used, hermetically sealed, so that the water is confined and heated to 350° or higher,—consequently much less pipe is required than in those where they are kept at 212°, or a very little over. In London these iron pipes are frequently used for gas, instead of lead, which answers the purpose quite well; so I presume their cost cannot much exceed that of lend pipe. One great advantage of this "high pressure" method is, that all your boiling may be done without the cost and dirt of an extra fire, and in wooden or any other vessels, simply by projecting the pipe from the wall a foot or so, bending it downwards, and making a coil, and returning it upwards and back to the wall. The high temperature of the water circulating within the pipe, will cause that in any vessel placed under it to boil rapidly. It is hardly necessary to state that the pipe, after running and coiling in the partitions of the rooms to be heated, returns into itself somewhat below the level of the fire; so that the water which has given off part of its heat, being denser than that which has but just passed through the fire, gravitates with greater power, and forces up the other, and thus keeps up a constant circulation. Your correspondent will find these various methods detailed at length, in those volumes of the London Mechanics' Magazine, and the London Journal of Arts and Sciences, published since 1827, which volumes he may get from Francis' Library, under Peale's Museum.

It may be well to mention that Mr. Perkins is an American, and perhaps has a patent right in this country. There are other modifications of the hot water principle invented by Englishmen, and therefore not patented here, and which the laws of honor will allow us to use freely, so long as the legal enactments restricting commerce in the products of genius and industry in the two countries are allowed to remain in force.

Your obt. servt.,

J. K. F.

New-York, June 4, 1836.

NOTE.—I had almost forgotten the question whether the heat from water pipes is sufficient for the coldest weather in our winters? There will be no difficulty on that score if your pipe is long enough, and the fire hot enough. I have been told that Mr Perkins says he can heat a whole pari from one fire.

From the Maine Farmer.

"WHAT FARMERS MAY BE."

MR. HOLMES:—Your interesting correspondent, "J. H. J." under the above title, in the last Farmer, lays down three distinct propositions, showing in substance that Farmers *may* be the most learned, and the most influential class of men in the world. Under each proposition he has adduced several good reasons in support of them, and I can most cheerfully assent to all that he has said upon the subject. But while I am so ready to give in my adhesion to his doctrine, I am inclined to think he will find it not an easy task to induce any considerable portion of them to carry out in *practice*, what he has so correctly laid down in *theory*.

The occupation of a Farmer certainly requires the "most vigorous exercise of the physical powers of the body," and if you cannot induce a man to adopt that system of labor, which shall render the exercise of these powers productive of the greatest amount of ultimate good, you can hardly expect to convince him, that he may become one of the most learned and influential men in the world.

If I may be permitted to advance an opinion I will say that, judging from daily observation, it would seem that many believe the exercise of mental and physical powers have no connection in the business of husbandry, that our fathers and grand-fathers *thought*, all that was necessary for mankind *to think* upon the subject, and that nothing remains for us to do but work, work, work, without even *thinking* that we have power *to think*.

Therefore if we would lay a "firm basis on which to build up their minds in wisdom and knowledge," we must first convince them that the course pursued by our fathers and grand-fathers in relation to husbandry, is by no means the best course

Convince them that in general a small farm is better than a large one.

Convince them that a little, well tilled, is better than much half tilled.

Convince them that two loads of manure is better than one, and every load judiciously applied is worth a silver Dollar.

Convince them that three good Cows are better than half a dozen poor ones, and so of all other stock.

Convince them that raising their own bread stuff and a little to sell, is far better than "going to New York to mill."

Convince them that two blades of grass may easily be made to grow, where only one grew before.

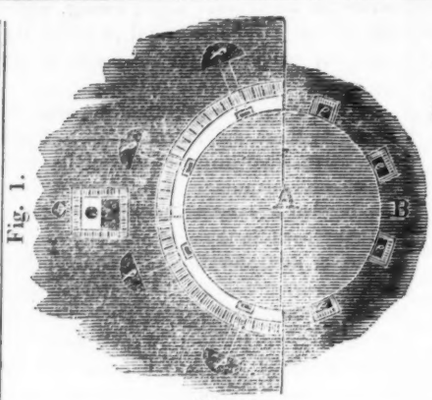
Convince them that experiment is the mother of improvement, and improvement the true source of wealth.

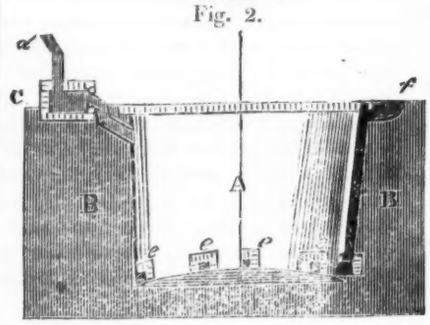
Convince them of these simple TRUTHS, and induce them to practice accordingly, and the work is done.

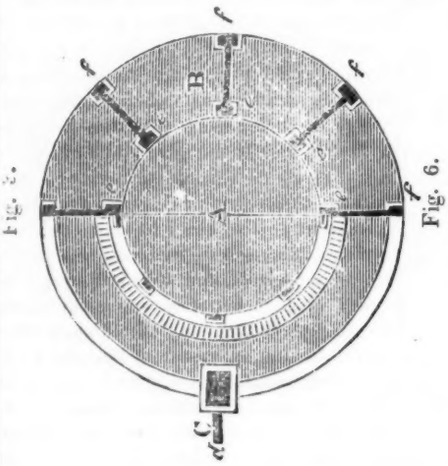
You will then bring *mind* and *body* to act in unison. You will elevate the husbandman to his natural sphere in the scale of existence. You will place him in the road to higher eminence. He will *think* for himself, he will be learned, he will be wise, he will be wealthy and influential.

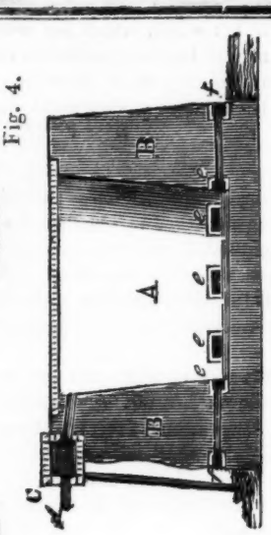
CAROLUS.

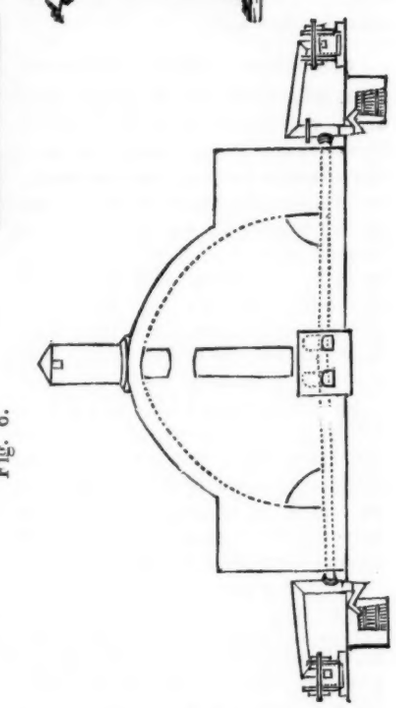
May 7, 1836.











Applications of Chemistry to the Useful Arts, being the substance of a Course of Lectures delivered in Columbia College, New-York, by James Renwick, Professor of Natural Experimental Philosophy and Chemistry.

V.

APPLICATIONS OF HYDROGEN, CARBON, AND THEIR COMPOUDS.

1. AEROSTATION.

The only direct use to which gaseous hydrogen is put, is to the filling of balloons. The hydrogen for this purpose is prepared in the mode usually practised in chemical laboratories but on a larger scale. The substances employed are water, clean iron filings, and sulphuric acid. The apparatus is composed of a number of barrels which are arranged in the circumference of a circle. In each of these, iron filings is introduced to the depth of a few inches, and the barrel is then headed up. Through the head of each barrel a leaden pipe is introduced which reaches nearly to the bottom of the barrel and is formed into a funnel on the outside of the cask. This serves for the introduction of the water and sulphuric acid. Another leaden pipe is passed through the head of each barrel without entering beneath its lower surface. These pipes serve to convey the gas generated in each barrel to a common reservoir, placed in the centre of the circle around which they are arranged. This reservoir is of the character of the chemical apparatus called a gasometer. It is formed of two large tubs, one of which is inverted within the other. The space between them, as well as the inner tub, is filled with water, the air being allowed to escape from the latter by a tube adapted to its head and furnished with a stop-cock. As soon as this tub is filled with water the stop-cock is closed.

The tubes which convey the gas are passed over the edge of the outer tub or

through its staves, and their open ends pass beneath the cavity of the inner tub. The gas therefore enters it, and rising to the surface of the water tends to buoy it up, which action is aided by a counterpoise until the balloon is ready to receive it.

Balloons are bags of a spherical or sphersidal form, made of gores of silk, coated with a varnish which renders it imperrious to air. The best for this purpose is made of caoutchouc. Each of the gores is prolonged into a rectangular strip, and these, when sewed together, form a long cylindric tube. The air having been forced from the balloon by compressing it, this tube is tied to that which is adapted to the inverted barrel, the counterpoise being removed, and the pressure, if necessary, aided by loading the gasometer with weights, the contained gas, with that which is subsequently generated in the barrels, is forced into the balloon until it is completely inflated.

Hydrogen gas having not more than $\frac{1}{7}$th of the density of atmospheric air, the joint weight of a large balloon and the gas which it contains, is far less than an equal bulk of atmospheric air, and it will not only rise itself but will carry with it a considerable additional weight. In order to attatch a weight to it, a net work is formed of cords in such manner as to embrace the upper half of the inflated balloon, and from its equator, straight cords proceed, to which a car is tied. The balloon must be of such size as not only to carry up the persons who are to mount, with their necessary equipment, but also a considerable quantity of ballast. This is in the form of sand tied up in canvass bags. The object of this combined with a valve in the top of the balloon, is to enable the aeronaut to ascend or descend at pleasure as long as the ballast and the gas in the balloon are not wholly expended.

This valve is placed on the top of the balloon and is thus constructed: the gores, instead of meeting in a point, are united upon a ring of whalebone, and thus leave a circular opening; to this a circular shutter of silk, spread upon a similar ring, is adapted by a hinge; two cords proceed from this, over the net work, in opposite directions to the car; by one of these the valve can be opened, and by the other, closed.

Then the balloon is released by cutting cords which held it down, the tube which proceeds from its lower point, and is long enough to reach the car, is left open, in order that the gas in the balloon may be at liberty to escape as it tends to expand itself, in consequence of its reaching regions in the atmosphere less dense then those nearer the surface of the earth. Although the escape of this gas renders the balloon somewhat lighter, it must finally reach a position where its weight is exactly the same as that of an equal bulk of the surrounding air, and must cease to ascend. A farther height may be attained by throwing out ballast. This is done by opening the bags in which it is contained.

When it is wished to descend, the valve in the top of the balloon is opened until the collapse caused by the escape of the gas renders the balloon heavier than an equal bulk of the surrounding medium, and the force which causes the descent will be an increasing one, as the collapse is increased by the increasing pressure of the denser air. It may therefore be necessary to check it by the discharge of ballast, and by doing this in sufficient quantity, the balloon may be rendered stationary or caused to ascend again. In the latter case it is no longer necessary to allow the gas to escape by the tube beneath, which is therefore closed by knotting it.

A balloon has no other capacity of being directed except in ascent and descent. No power has yet been discovered, which can be called into action, of sufficient intensity to propel a balloon through the air, and make it move in a direction contrary to the currents of wind, and which shall be produced by apparatus sufficiently light to be carried up by a balloon.

USES AND PURIFICATION OF WATER.

Water as found in nature is never absolutely pure. Even when it contains no solid matter, either in solution or mechanically mixed, it is charged with gases. The most important of these are carbonic acid and oxygen. These however, so far from being injurious, are absolutely necessary to render water palatable, and probably increase its usefulness in the animal economy. Water which falls in cities where coal is used as a fuel, contains sulphurous acid gas in solution, which gives it a disagreeable taste. This may be readily separated by heating it to the boiling point; as, however, the othus gases will also be driven off, water ther purified must be exposed to the air for some time, in order that it may again absorb oxygen and carbonic acid. The water of rivers is often turbid, in consequence of their carrying with them earthy matter in a state of minute division, it may also contain animal and vegetable matter, or even living animalculæ. Such organic matter renders it unwholsome. The earthy and heavier organic matter may be separated by placing the water in tanks and reservoirs where it may remain at rest, and the clear fluid may be drawn off, but in this way living animals and lighter substances will still remain. It is therefore better to purify it by filtration. In order to deprive it of all disagreeable taste or smell, a part of the filter should be composed of charcoal. By long use, the charcoal will finally become so charged with the offensive matter that it will cease to act. The filter must then be opened and the charcoal replaced by another portion of the same substance, or the old charcoal purified by heat.

The same property of charcoal may be applied to the purification and preservation of water in ships. For the first purpose it is only necessary to mix thoroughly with the water in the casks a few ounces of powdered charcoal; for the latter the casks may be charred within. The purification of water from insoluble matter by filtering is performed by nature on a large scale within the crust of the earth, and that which issues from springs, and is found in wells is usually purified; but it may thus receive soluble impurities, although there are unquestionably some cases where the natural filter has the property of decomposing and retaining the soluble matter. Thus, on islands which are mere sandbeaches, fresh water may often be found by digging, which can have no other source than the neighboring water of the ocean, but this natural process has not been imitated by art.

The mere separation of insoluble matter from water has sometimes been effected on a large scale by taking advantage of natural circumstances. Thus at Glasgow, instead of pumping water from the River Clyde, tunnels of brick laid in sand are sunk in the gravelly bank of the river; through this water filters, and is drawn from the tunnels by a steam engine. At Toulouse, the reservoir which supplies the city is a basin dug in a gravelly bank, and separated from the river by a narrow dyke, through which the water passes perfectly clear. This reservoir has another valuable quality which we cannot avoid mentioning. The lower part of it is filled with large boulders, on these smaller water worn stones are laid; these are succeeded in turn by gravel, and the gravel by sand. The water which occupies the spaces between the stones is thus maintained throughout the year at an uniform temperature, and is neither affected by the frost of winter, or the scorching heats of summer. This temperature too, which is that of native springs, is such as causes the water to retain the greatest quantity of the gases which render it palatable.

Water which is conveyed great distances in pipes, or is precipitated in falls, loses these gases and will not regain them until exposed to the air. A remarkable instance of the last sort occurs at the Falls of Niagara, where the water above the fall is agreeable, and in the pool below as nauseous as that which has been boiled. The same action has even been applied to procure air separated from falling water, to be used in the manner of that forced from a bellows.

Water which comes from springs in the vicinity of the sea or its arms is often impregnated with marine salt. It is then said to be brackish, and for this no remedy has yet been propsed except the costly one of distellation. That from inland springs often holds in solution carbonate of lime by excess of acid, and sulphate of lime. These give the water the character called *hard*, rendering it unfit for the solution of soap, for making vegetable extracts, and for being used in the arts of bleaching and dyeing. It is also less wholesome as a drink, and, except to persons whose taste has become vitiated, disagreeable.

Nature has provided a slow but sure remedy for this defect. On exposure to the air the excess of carbonic acid which holds the carbonate of lime in solution, is dissipated, and that earthy salt perciptated. If on the other hand sulphate of lime be contained in the water, the superior affinity of that earth for carbonic acid will cause it to attract that acid from the atmosphere, by

which this insoluble carbonate will be formed. Thus the water of stagnant ponds, even in countries where calcareous matter abounds, may be well adapted to manufacturing purposes. Such water is however unwholesome, as it undergoes decomposition from the presence of putrescent vegetable matter. But when large rivers flow for a great extent, with a regular and steady course, these chemical changes take place without the corresponding inconvenience arising, and in addition by an action not yet explained, all animal and vegetable matter is rendered insolubie. For this reason the waters of the Nile, the Ganges, and the Mississippi have a well founded reputation for their delicious taste. Even the water of rivers which receive every species of offensive animal and vegetable matter, is, when filtered, almost perfectly pure.

We learn from this, that in supplying cities with water, the true plan is to bring it so far as possible in channels formed like a canal in the natural earth. Channels of masonry are of all the most to be avoided, as the water cannot fail to be contaminated with calcareous matter which will render it unfit for use in any of the chemical arts. The antients did not feel this objection to the use of aqueducts of masonry, partly because they had not reached that advance in the chemical arts, which now makes their practice almost a necessary of life, but more particularly from the very superior quality of their masonry, which was so accurately jointed as hardly to admit the edge of a knife. This perfectiou is not beyond the reach of modern art, but would involve an expense which would not be submitted to.

When water holds calcarous matter in solution, the lime combines with certain acids which exist in all soap, and form with that earth an insoluble compound, which is lighter than water and floats at its surface. The sulphate of lime, which is most frequent, may be decomposed by the salts of ammonia and hence the use of putrescent urine in the art of bleaching.

As this sulphate has the property of combining with vegetable matters and rendering them insoluble in water, water may be rendered soft by boiling in it for a long time some muculagincus vegetables. A more speedy method of rendering hard water soft is as follows:

To purify 100 gallons of water; dissolve six pounds of pearlash, or subcarbonate of soda in a gallon of soft water, boil the solution, when it boils add two ounces of soap cut into small pieces, and stir the boiling liquid until the whole of the soap is dissolved. When this solution is added to the water to be purified, the soap and sulphate of lime mutually decompose each other, the insoluble compound of the acids of the soap with the lime rises and coagulates at the surface, whence it may be sktmmed off.

The sulphate of lime may be more slowly decomposed, by adding a small quantity of carbonate of soda or potash. The acid of this will finally convert the lime into carbonate, which will be precipitated when the excess of acid is expelled. The mode which immediately preceeds, is however, more certain and rapid, and will fit the water for every use in the arts. This is the mode which was referred to in speaking of the bleaching of wool as capable of superceding the offensive matter which is now in use.

Water is most extensively used in preparation of our food, and the proper application of it to this purpose is by no means so simple as it might at first appear. The fibrous flesh of animals is made up of two distinct substances, albumen and gelatine. The former is insoluble in water, and coagulates at the temperature of boiling; the latter is slowly soluble in cold, and more rapidly in boiling water, by which it is previously softened. Albumem exists nearly pure in the white of an egg, gelatine when separated from other matter becomes glue.

When meat is to be cooked by boiling, if it be suddenly exposed to the boiling temperature, the albumen coagulates, and forming a hard coat, protects the gelatine from the action of the water, and although by long continued boiling the latter may be dissolved, the meat will remain in the form of tough stringy fibres. But if it be slowly raised to the boiling heat, the albumen retains its viscid liquid form until the gelatine is softened and partially dissolved; part of the former also separates and rises to the surface of the fluid whence it may be skimmed off.

It is the solution of the gelatine in water, with a part of the liquid matter of the meat which forms the broth which is the basis of soup.

It will be easily seen from what has been stated, that sudden heat and rapid boiling will render the meat tough, or if continued until it be tender, stringy and tasteless. On the other hand, if gradually heated to the boiling temperature without being ever permitted to boil rapidly, the broth will be more readily charged with gelatine, the meat will be tender and full of its original juices.

It is to the proper application of these principles that the great superiority of French over the English and American cookery is mainly to be attributed, for the broth is not only used by the French in the form of soup but is the vehicle of all their sauces, and the meat whence the soup is prepared, instead of being useless as with us, is the most important of their dishes.

The fat of animals is rendered soluble in water by vegetable matters, and this furnishes an important addition to the means of preparing food. Vegetables fried in butter or fat, and boiled in water, furnish a nourishing and palatable liquid, the *soupe maigre* of Catholic countries. The bones of animals contain large quantities of gelatine, but this is so intimately mixed with an insoluble substance (the phosphate of lime,) that it cannot be separated, except from the mere surface, by water at the ordinary temperature of boiling. Water, however, heated in close vessels to a higher temperature, acquires the power of separating gelatine even from bones. For this purpose, an instrument was invented about 150 years since, by Papin, and called by him the digester. It is a strong vessel of copper, to the mouth of which a circular lid is close fitted by grinding. The vessel stands in in an iron frame having four feet. To the top of these feet a cross of iron, which rests upon the lid, is fastened by screws, and thus the lid is prevented from rising when the first steam is generated within. To complete the arrangement, a safety valve is provided, by the weight of which the pressure of the steam within, and consequent temperature of the water is regulated.

The arrangement for closing the lid of Papin's Digester is too complicated for domestic use. In order to simplify this part, the digester has been modified into the Autoclave. The mouth of this is of an oval form; the shape of the lid is the same, but larger in each of its dimensions. In consequence of both having this figure, the lid may be passed into the vessel and turned around within it, until its longer axis is in the same direction as that of the mouth. In this situation, the first steam that is generated presses the lid close against the vessel, and effectually closes the mouth.

The presence of sulphate of lime renders vegetable matter insoluble in water. Hence green vegetables can only be well cooked, and appear of a good color, in soft water. The latter effect may, however, be attained even with hard water, by adding a small quantity of pearlash to decompose the sulphate of lime.

MANUFACTURE OF CHARCOAL.

Rationale.—When wood is burnt in the open air, under favourable circumstances, as a considerable part of it is either inflamable or volatile, it is dispersed in the process of combustion. The residue is earthy in appearance, and is known by the name of ashes. The quantity of ashes given by different woods, and by different parts of the same tree, vary very materially. Thus the wood of the linden yields eight times as much ashes as the wood of the pine, and bark from 15 to 30 times as much as the wood within. The linden seems to yield the largest quantity of ashes, which is as much as much as five per cent; oak yields about 2½ per cent; and pine eight tenth per cent. The character of these ashes varies in different kinds of wood, but the substances which are almost always found, are the cabonate of lime and magnesia; phosphate of lime; chloride of potassium, and the sulphate and carbonate of potassa; and silicia, either pure or combined with potassa and lime.

By distillation and heat in close vessels, and condensing the volatile parts, the whole of the matter of the wood may be collected. This is now found to consist of a black mass, retaining the figure and structure of the wood, and known by the name of charcoal, composed of carbon, and the earthy and saline matter mentioned as found in ashes; water; acetic acid held in the water; tar, partly unmixed, and parly dissolved in the water by the action of the acetic acid; with carbonated hodrogen, carbonic oxide and carbonic acid. At the temperature of 340° Fahr. the quantity of solid matter left is nearly double that left at a red heat, and if exposed suddenly to a heat above redness, the quantity of charcoal left, is diminished. The

charcoal is itself a product of sufficient value to be sought for to the exclusion of the rest; at other times the decomposition of wood is effected principally for the sake of the acetic acid; the carbonated hydrogen has in some few cases been collected and applied to the purpose of illumination, and when this is the case the tar is also saved.

Manufacture.—The most perfect mode of manufacturing charcoal, is that which corresponds most nearly with the distillation referred to in the preceding section. Wood is introduced into iron cylinders, which are closed, and placed in a heated furnace.—The action is continued as long as any gaseous or volatile matter appears. The cylinder is then removed, and replaced by another also charged with wood. As the gas which is evolved is principally of an inflamable character, it is, after the condensable substances have been separated in a proper refrigerator, carried by a pipe to the furnace, where it is inflamed by the burning fuel, and by the heat of its combusiion, aids in the distillation of the remainder of the wood. This method is employed in the manufacture of charcoal for gunpowder.—In this process, it has been found that dry wood yields 28 per cent. of charcoal, and requires 12½ per cent. of the same wood, used as fuel, to effect its decomposition.

That part of the volatile matter which consists of water holding acetic acid, and tar in solution, goes by the name of pyrolignous acid. This process is sometimes conducted principally in reference to this product, which may be used in the preparation of vinegar, and as a source of pure acetic acid.

The apparatus used in this method is too costly to permit it to be employed in making the great quantities of charcoal which are required in various chemical and mechanical arts, and for domestic purposes. In these cases, recourse is had to the simple and ancient mode of carbonising the wood, in what are usually styled *coal-pits.*

The wood which is to be converted into charcoal, is cut to the usual length of cord-wood, say about four feet. A floor is first formed by laying logs radiating from a centre, with an interval of a few inches between them, and filling the sectors of the circle included between them with other logs. At the centre of this circle, a stake is set up vertically, to the top of which two short pieces, crossing each other, are adjusted. Four logs are placed on end, leaning against the stake and supported by the cross. Around these, other logs are placed leaning against them, thus forming a truncated cone resting on the horizontal layer. If the quantity of wood permit, a second and a third range of logs are piled up in the same manner; the rule to be observed, being that the height of the truncated cone shall be about half the diameter of the base. The heap being completed, the outside is covered with small wood, on which are laid twigs and branches. Upon these, a layer of earth, from 4 to 6 inches thick, is placed, covering the whole heap, except a few openings, one of which is in the middle of the top, and others correspond to the radiating passages in the horizontal layer.

The pit being thus finished, it may be set on fire either by pushing burning brands to the centre of the base through one of the horizontal passages; or by drawing out the central stake of the upper layer, and dropping in burning fuel.

A thick smoke will first ooze through the hole at the top of the heap, which will be followed, after a time, by flame. As soon as flame appears, this hole is closed by laying a sod over it. It now becomes necessary to pay particular attention to the regulation of the combustion, by closing and opening the remaining holes, in proportion to the energy of the combustion. If it be too rapid, too large a portion of the charcoal will be consumed; if too slow, the logs will be only partially charred, leaving what are called brands. In addition to the holes already left, it may be neeessary to open others at points where the combustion is too slow, and to stop up crevices which may be formed by the cracking of the earthen covering. A regular and proper action is marked by smoke flowing slowly and in equal quantity from all the openings but that at the top, where the greater rapidity of the current causes a larger quantity of smoke to make its way from under the sod laid upon it. When the outer logs of the pile have been reached by the fire, which will be shown by the outside appearing of a dull red heat at night, the process is completed; all the openings must then be carefully stopped, and a second layer of earth applied to the whole surface. After a few hours, these coats of earth are removed, and replaced by a third, which must be so applied as to prevent all access of external air.

In a pit of a single layer, the whole process is finished on the fourth day, and the charcoal fit to be drawn. In the largest heaps, it may not be finished for from 15 to 30 days.

This process would be perfect, were no more wood burnt away than is sufficient to drive off the volatile matter of the remainder. It is, however, hardly possible to attain this, although it is said to have been approached in Sweden, in some instances, when the heaps were of the largest size. In this operation, even when performed under favorable circumstances, it rarely happens that 112½ lbs. of wood yield more than 17 of charcoal, while by distillation in a cylinder, the same quantity, as we have seen, yields 28 lbs. It is also impossible, in this method, to collect the pyrolignous acid or gas.

The waste which thus takes place, has led to various attempts to improve the process. Among these, has been the formation of moveable enclosures of basket-work, by which the pits might be surrounded, and which, if carefully guarded from combustion during the first time they are used, are so much charged with pyrolignous acid as to be thereafter almost incombustible. Another method is, to form the floor of the pit of iron sheets, or cast iron plates, beneath which is a cavity that serves as a furnace; no air holes need be left in this method, and thus little wood is burnt away. It has been proposed, by Mr. Marcus Bull, to effect the conversion into charcoal, at the expense of fuel of inferior value; for this purpose, the whole space between the logs is filled up with the refuse charcoal of former burnings, which, being more inflammable than wood, burns first, and chars the logs.

By either of these methods, the product of 112½ lbs. of wood may be raised to 22 lbs. The last is obviously easily practicable; as wherever the preparation of charcoal is carried to a large extent, the removal and handling leaves a considerable quantity of dust and small fragments which may be applied to the purpose.

At the Bennington furnace, (Vermont,) where the coal is obtained from a tract of wood land which has never before been cut, a mode of preparing charcoal, different from any we have described, has been put in practice. The trees were of so large a size, as to render the labor of cutting them in lengths, and piling them on end, excessive. They, in consequence, were not reduced to less dimensions than 12 feet in length, and were rolled together into piles in which they retained their horizontal position, and which, therefore, had a prismatic form. These heaps were covered with earth, and lighted from the top; the draught vents were at the ends. The management, in other respects, was the same as in the conical pits, and the charcoal was of superior quality.

IMPROVED MODES OF PREPARING CHARCOALE.

AUTHORITY.—DUMAS' Chimic appliquee aux arts.

In consequence of the great waste of charcoal, in the usual mode of preparation, and the entire loss of the volatile matter, two modes have been contrived, in either of which the quantity of charcoal obtained may be almost as large as in iron cylinders, and the volatile matters may be collected.

The first of these is best suited to the hard woods which contain but little sesinous matter. This operation is performed in a kiln of the shape of a cylinder, or rather a truncated cone, whose larger base is uppermost. It may be built of sods or tenaceous earth above the natural surface of the soil, but may be more conveniently excavated to such a depth that the earth thrown out may serve to form the upper part of the enclosure. In the only instance in which we have seen it employed in this country, namely at the West Point Foundry, the excavation is lined with brick.

In order to admit air to the kiln, when made by excavation, for the purpose of maintaining the combustion, tubes of earthen ware or cast iron, are carried down from the surface of the ground to the bottom of the excavation; these lie behind the lining, and are either passed through it near the bottom, or enter small brick vaults, which communicate with the interior of the kiln. The kiln may be closed at top by a cover made of sheet iron, to support which when the lining is not of brick, a ring of bricks must be placed around the top of the excavation. The cover must extend on all sides three or four inches beyond the opening of the kiln, in order to have a suffi-

cient support. In this cover there are several openings, one at the centre, the others near the circumfrence. Through each of these a short tube or flue of sheet iron passes, and the several tubes are furnished with stoppers of iron.

The size described by Dumas is 10 ft. (French) in diameter, and nine feet deep. The central tube is nine inches in diameter. The number of these at the circumfrence is four, each four inches in diameter.

That used at the West Point Foundry is 12 feet in diameter and 9 feet deep.

In order to condense the volatile matter, one opening is made in the lining near the top of the kiln to which a tube of cast iron or earthenware is applied. This tube communicates with a small chamber built of brick, about 18 inches long, a foot in width, and 15 inches high, entering about the middle of its height. From the top of this chamber, proceeds a pipe of sheet iron, which after rising vertically 4 or 5 feet assumes a horizontal direction for about 15 feet more; at this distance there is no fear of fire, and the rest of the pipe may be of wood. The extension of the pipe communicates with a condensing apparatus, on the principle of Woolf, but which may be formed of common barrels.

In charging the kiln with wood, a post whose height is equal to the depth of the excavation is set up in the middle, and supported in its place by a heap of fragments of charcoal. A number of the larger logs are chosen and laid on the bottom of the kiln in such a manner as to form rudiating flues terminating at the places when the air tubes pass through the lining. Across these a horizontal layer of logs is laid. The radiating logs must neither touch the post or the lining of the kiln, the secondary layers extend from the one to the other. Layers are then placed in succession in such manner as to leave as little empty space as possible, particularly near the circumfrence, until the kiln is filled. The kiln having been charged, the post is drawn out of the middle, the cover set in its place, and coated to the depth of not less than two inches with dry earth.

The stopers being withdrawn from the flues in the cover, lighted charcoal is pourd down through the middle tube; this falls through the space left by the post, to the heap of charcoal by which it was steadied, and sets it on fire. The central flue is then tightly closed, in order that the draught may be directed toward the outside of the mass of wood. In order to make the joint of the stopper tight, it is luted with plastic clay. The other flues begin to discharge smoke, which is surrounded by flame. As soon as the flame ceases to have a blue color, and becomes white and clouded, the flues have their stoppers loosely applied to them, and the openings of the descending air tubes are diminished. The draught will thus be directed to the condensing apparatus. But if the collection of the acid be not intended, the tubes in the cover are but partially closed. The combustion may be regulated within the kiln by the air tubes and those in the cover. Thus, too rapid an action in any one part may be checked by completely closing the several air tubes and the opposite flue; and if it be too slow, these must be opened as far as possible until the action be restored.

For a kiln 10 by 9 the operation occupies from 60 to 80 hours, and is known to be complete when the upper layer of wood appears to be incandescent; when this has taken place, the stoppers of all the openings except that of the central flue are removed for a short time, and a quantity of hydrogen will be expelled which if does not injure the quality of the charcoal, would render it less saleable. As soon as the peculiar flame of hydrogen ceases, all the openings, both of the air tubes, and flues, must be closed by shuting their stoppers with clay, and covering them with caps of sheet iron containing clay. The dry earth is removed from the cover, and it is plastered with earth mixed with water. The charcoal thus shut up will take 60 or 80 hours to cool.

A plan and section of this description of kiln is represented in Fig. 1, 2, 3, 4 and 5.

Fig. 1 and 2. Being plan and section of one formed in an excavation, and

Fig. 3 and 4. Of one built above ground.

Fig. 5. Cover of sheet iron applicable to either.

A. Interior of kiln.

B. Wall or lining of earth.

C. Chamber in which the tar may be condensed.

d. Pipe leading to the condenser for pyrolignous acids.

e, e, e. Air-vaults.

f, f, f. Openings by which the external air is admitted.

At the Bennington Furnance, a kiln of similar form was constructed of brick, above the level of the ground and covered by a permanent dome of brick. In the wall a door was left for the introduction of the wood and this was subsequently bricked up. Vents were formed by leaving bricks loose in the wall and when the process was complete the fire was extinguished by means of water. An unexpected benefit was found to arise from the latter operation, for the coal becoming charged with aqueous vapour, was as fit for immediate use, as that which had been prepared for several months.

It is estimated that the product of kilns of this kind in France is about 25 per cent. more than in a coal pit. The experiment at the West Point Foundry was more advantageous, the product having 50 per cent. more than was obtained in the usual method. In France the main object was the pyroligneous acid, which at West Point was neglected, and this difference in the object will account for the difference in the results. The mode of placing the wood was also different, the French using that which has been described above while at West Point it was placed vertically.

In the pine forests of Sweden, an apparatus better suited to the collection of the turpentine that kind of wood furnishes, has been invented by Schwartz. This kiln is composed of a vault, built of brick or silicious stone laid in a mixture of clay and sand. Common mortar must not be used as it would not only be affected by the heat, but would be completely destroyed by the pyrolignous acid. The vault is closed at each end by a vertical wall of the same kind of masonry. The floor of the kiln is of earth, and has the figure of two planes slightly inclined, and meeting in a gutter in the middle of the longer sides of the vault. In each end wall are two fire places, and in one of them are four openings for introducing the wood and withdrawing the charcoal. The smoke and vapour are carried off by flues of cast iron at the level of the ground, and proceeding from the middle of the larger sides of the vault; these terminate in channels where the vapour is condensed and which convey the smoke to two vertical chimnies. A section of this kiln is represented in Fig. 6.

The advantage of this arrangement is, that no air can enter the kiln without passing through the fire places which are kept full of burning fuel; and that the fuel which is best suited for this purpose, (small branches and twigs,) is useless in making charcoal. In placing the wood, the pieces are laid parallel to the largest sides of the vault, and in such manner as to leave as little space as possible except in the neighbourhood of the flues, which must be kept free for the escape of the smoke and vapour. Two days are sufficient to convert the wood into charcoal, and the end of the process is known by the appearance of the blue flame of carburetted hydrogen at the chimnies. The whole of the openings are then closed and luted with clay.

At the end of two days, two holes left for the purpose in the arch of the vault, but which have during the process been carefully closed, are opened and water thrown in to cool the charcoal; these holes are then closed again. At the end of three or four days more, one of the doors in the end wall is opened and more water thrown in, but the charcoal will not be ready to be removed until all the external parts of the apparatus have become as cold as the surrounding air.

This kind of furnace has been much used in Europe, and the quantity of charcoal obtained is one third more than is obtained from coal pits. The turpentine and arcetic acid are also saved, which in other cases are lost. There can be no doubt that it might be introduced to advantage in those parts of our country where iron is manufactured by means of charcoal prepared from pine wood.

In using kilns of either description it becomes a matter of calculation whether it be cheaper to manufacture the charcoal in the woods in the usual manner, or to carry the wood to the kiln. The weight of the charcoal to be transported will be only 17 parts of that of the wood; while the charcoal obtained by the kilns will be certainly one third more than that procured from the pits. It must therefore appear that the value of the additional charcoal shall be at least equivalent to the cost of transporting the wood to the kiln. It is also to be remarked that charcoal prepared on the spot where it is to be used is better than that which has here been handled and carried over rough roads, and that all waste is avoided.

THE POTATO SQUASH.—We have received some *Squash Seeds*, together with the following note.

MR. FESSENDEN,

Sir—I send you for distribution, though perhaps, rather late a few squash seeds, which I obtained in Illinois last season. They are known there by the name of the "Potato Squash," resembling very much the sweet potato, being very dry and sweet to the taste. If they can be raised here as well as there, they will surpass all others. I ate of them mashed as we mash our common potato, and their flavor was exceedingly fine. They grow about the size of the common short necked squash, and weigh about six pounds; their color nearly white.

Respectfully,
JACOB N. BANG.

We are much obliged to the donor of the above mentioned seeds, and will distribute them among careful cultivators, in small parcels for the benefit of the commonweal. [New-England Farmer.]

From the Genesee Farmer.

WHO WILL NOT PLANT A LOCUST TREE?

A Mr. Hale of Westhampton, (Mass.) obtained last year for thirteen locust trees, delivered at the river in West Springfield, 50 cents per cubic foot including all the limbs, except those quite small. The trees measured 306 feet, and amounted to 153 dollars; thus producing 153 dollars for less than two and a half cords of wood. Let us make this fact the basis of a little calculation. The locust will thrive abundantly on favorable soils when planted a rod apart, or one hundred and sixty on an acre. Mr. Hale's trees averaged him $11,72 a tree, which for an acre of trees of the same size would bring one thousand eight hundred and seventy-five dollars twenty cents. It has been estimated that six locust trees of twelve years growth will produce a cord of wood, and in many instances they have far exceeded it; but to be on the safe side, we will take six and a half and let them grow eighteen years instead of twelve, and then the avails of the acre will exceed one hundred dollars a year for the eighteen years. If this is not a handsome profit we know not what is; and there is this additional circumstance attending it; locust timber will not fall in price, as the demand, from the nature of the case, must continually increase. Then plant the locust by the wayside, fill up the vacancies in your woodlands with it—remembering that every one that grows, puts in your pocket 100 per cent per annum. G.

AGRICULTURAL PAPERS.

While contemplating the immense and incalculable benefits which must necessarily result not only to the farmer and planter, but to the public in general, and to every class of the community in whatever occupation engaged, from the general improvement of agriculture and the powerful tendency of agricultural papers to produce such improvement, the man of reflection, who loves his country, and who feels any regard for the happiness of his fellow men, cannot but be struck with astonishment, not only at beholding so many of those who are devoted to the profession of agriculture, and who are entirely dependent on it for the supply of all their wants, voluntarily debarring themselves from the easiest, the most agreeable, the cheapest, and the most effectual mode of acquiring knowledge in their profession—but at the short-sighted views of those who are obviously not less deeply interested than the farmer himself, in producing that state of improvement, on the production of which the prosperity of all is alike dependent. Let every man but ask himself, what would be the effect on the public prosperity, and on that of every individual of which society is composed, whatever may be his occupation, were the fertility of the land and the quantum of his annual production to be doubled, trebled, or quadrupled—all must see at a glance, that the national wealth and resources would be in the same degree enhanced. The government would be enabled, with far less inconvenience to the people, to raise double, treble, or quadruple the revenue which can now be collected, either for the purpose of defending the country against foreign enemies, improving it by roads, canals, &c., or for what is of still greater importance than either, the establishing and sustaining a system of Universal Education, by which, and by which alone, liberty can be perpetuated, the people elevated to that dignity and worth of which they are capable, and which it should be considered the first duty of every Republican Government to confer. The farmer and planter would be benefitted by receiving a double, a treble, or quadruple reward for his labor, to be expended in supplying his wants, increasing his wealth, or promoting his comfort. The merchant, the lawyer, and the mechanic, will be benefitted by a double, treble, or quadruple ability in their customers to purchase their goods, or to reward them for their services; and above all, the laborer of every description, would be benefitted by constant employment, and good wages paid in ready money. In a word, universal prosperity would overflow the land, and universal intelligence and increase of virtue, would enable and dispose the people so to use it, as to banish from the country by far, the larger portion of that misery and distress under which mankind, in all ages and countries, have heretofore groaned, and which must continue to be their lamentable lot, until by an elevation of the intellectual and moral character of the mass of the people, they shall be qualified so to improve the resources which a benignant Providence has placed at their command, as to enable every one, by moderate labor, to acquire the necessaries and comforts of life. That such would be the ultimate effects of doubling, trebling, quadrupling the products of the earth by the industrious exertions of the agricultural community, if guided and directed by intelligence, is too plain to require proof. Would the general circulation of agricultural papers, by diffusing knowledge, and by continually presenting to the mind of the agriculturist, clear, unequivocal and demonstrative proof, that great and amply rewards, are the sure and certain consequence of such exertions, have a tendence to stimulate the community to active and intelligent exertions? He who doubts this, must believe the gross and palpable absurdity, that the greater the knowledge a man possesses of the business in which he is engaged, the more will he be disqualified to pursue it with advantage, and that the more clearly and distinctly the prospect of reward for his labor is held out to the farmer, the greater will be his indolence. With those who can believe these propositions, if any such there be, it would be vain and idle to reason—they can believe any thing they wish—their error proceeds not from the head, but from the heart—what they want is not the capacity, but the inclination to discover truth. To all others, of whatever character or occupation, we would say, if you believe that agricultural improvement would be thus beneficial to your country, conducive to the best interest of yourselves and of your fellow citizens, of every class and description, and that the wide and general circulation of agricultural papers would have a tendency to produce that improvement, do not patriotism, philanthropy, and an enlightened regard to your own interest, all conspire to demand, that you should exert yourselves by every means in your power, by your example, by your exhortations, by your instructions, and by your influence, to extend as widely as possible the circulation of papers entirely devoted to the diffusion of agricultural knowledge and the production of agricultural improvement—papers whose influence, while it may be productive of such incalculable good, can by no possibility be injurious to any human being? We ask you, calmly, soberly, and deliberately, to consider the subject, and then to act in such a manner as reason, conscience, patriotism, and an enlightened regard to your own interest, shall dictate. For ourselves, we entertain not a particle of doubt, that were some well conducted agricultural paper generally circulated and read in every neighborhood in the United States, its salutary influence would, in a few years, be clearly exhibited in the intellectual and moral improvement of the people, in the increase of the national wealth and resources, and in the increased happiness and prosperity of all classes of the community. To the production of such results we are not only willing, but desirous of contributing our utmost exertions, and it is therefore, that we solicit all those who have it in their power by the communication of agricultural knowledge, and by their exertions in promoting its diffusion to the widest practical extent, to afford us their aid and co-operation—on that aid and co-operation, we are fully sensible, must the success of ours, and similar efforts, in a great measure depend.—[Tenn. Farmer.]

From the Baltimore Farmer and Gardener.

VIRTUES OF LIME AS A MANURE.

We mentioned last week the republication of the excellent essay on this subject, by M. Puvis, in pamphlet form, and promised to give the very able *introduction*, with which the edition is prefaced,—from the pen of Professor Renwick, of Columbia College, New-York. It will be found below and will more than repay the reader for the time devoted to its perusal; for it is in truth a most luminious paper, replete with intelligence which every farmer should be in possession of. His explanations of the constituents of soils and the mode of action of lime, upon peculiar soils, are both so plain that none who wish to comprehend them can mistake their import. For ourself we are gratified to find gentlemen of Professor *Renwick's* distinction putting their shoulders to the wheel in support of the cause of agriculture, as, besides the brilliant lights which are thrown

out by them, the influence of their names is of incalculable value. We should not omit mentioning that the public are indebted chiefly to *James Wadsworth*, Esq. of New-York for the edition of this excellent work.

"The chemical facts and principles which are applicable to agriculture, are neither numerous nor complete. They are, however, to be found only in works on general chemistry, in which they are intimately associated with laws and phenomena of a more abstruse description, and in connection with which they constitute a science of which the most learned are still students, and to attain which in its existing form may require years of close and attentive study. The language, too, of chemistry, which, to those who study it in a regular course, serves as an artificial memory. and single words of which call up long trains of thoughts and experiment, presents the uninitiated all the difficulties of a foreign tongue.

Yet it cannot be doubted, that the practical farmer may derive important benefit from acquiring so much of this language as will enable him to understand the chemical explanation of the numerous changes which are continually taking place in the natural actions which it is his high privilege to call into his service, to direct in part, and modify in degree. So also certain chemical elements and compounds, with the properties of which he ought to be acquainted if he wish to be able to direct his practical skill with more effect, even in circumstances familiar to him, but which may be absolutely necessary, or will at any rate save waste of labor and loss of time, when the knowledge acquired by practice in one place is to be employed in a new situation, and under a change of circumstances.

It is the object of this introduction to exhibit, in such a form as may be intelligible to those who have not made general chemistry an object of study, a concise view of such of the laws and facts of that science, as are absolutely necessary for the agriculturist who may wish to improve his practice, and which are more particularly required by those who wish to avail themselves of the knowledge contained in the subjoined essay. To do this has been found no easy task. It would be in itself difficult, but to the author of this introduction has been more particularly so, as he has for years been in the habit of imparting instruction to those whose habits of life and thoughts are as remote as possible from those of the practical farmer; persons to whom the peculiar language of chemistry is an aid instead of an impediment, and who, with ample time at their command, have an opportunity of pursuing the study of the science step by step. Fully aware of these difficulties, both general and peculiar, this attempt would not have been made, and certainly not persisted in, had it not have been for the instances of an intelligent, scientific and successful farmer, who has urged the completion of the task as an object likely to be beneficial to those, who, with perhaps equal zeal and native powers of mind, have not enjoyed like himself, the advantages of a scientific education.

The atmosphere which surrounds our earth is the first object to which our attention should be directed. This is the vehicle of the moisture, which, whether it fall in the form of rain or dew, run in streams or issue from springs, is absolutely essential to the success of the farmer's labor. It is also, as we shall presently see, important to him on other accounts.

The greater part of the atmosphere is made up of a mixture of substances, each of which has the same mechanical properties as the whole mass. These air-like substances are known to chemists by the name of *Gases*.

Of these gases, two make up by far the greater portion of atmospheric air, and exist in it in the proportion of about 4 to 1.—That which is the largest in quantity and makes up nearly 4-5ths of the whole atmosphere, is called, in the Essay of M. Puvis, by the name of Azot, but is more usually known in English by the name of Nitrogen.

This substance, although in the largest proportion, is the least important of the gases in its chemical effects. It does not aid in supporting the life of animals, nor in maintaining the burning (*combustion*) of inflammable bodies.

The part of the atmosphere which is absolutely necessary for these purposes, is called by the name of *oxygen*, and nearly makes up the remaining fifth part of atmospheric air. In its support of life it always, and in containing combustion often, unites with a chemical element, which is called *carbon*. This is familiarly known as forming the principal part of charcoal. In its union with carbon, oxygen forms a peculiar gas known by the name of carbonic acid.

Carbonic acid is always found in small quantities in the atmosphere, to which it is furnished by the breath of animals and the fumes of burning bodies. It is, when in considerable quantities, fatal to the life of animals, but is prevented from accumulating to an injurious extent in consequence of its being taken up by water; it is therefore dissolved, in proportions about equal to those in which it is formed by rivers, lakes, the ocean, and the moisture of the soil.

Water exists in the atmosphere in the form of vapour. The great source of this vapour is the extended surface of the ocean, and it is governed by a mechanical law, by which it is continually tending to distribute itself uniformly over the whole surface of the earth. It may thus exist in as large quantities over the surface of the dryest land as over that of the ocean itself. The tendency to equal distribution is continually counteracted by the changes in the sensible heat (*temperature*) of the atmosphere, and of the surface of the earth, which follow the alternations of day and night, and the vissitudes of the seasons.—By these alternations and changes, the vapour is caused to fall (*precipitated*) in the form of rain, snow, hail, dew, or white frost, according to circumstances. As such changes of temperature are more frequent on the land than on the ocean, the water which falls on the former in either of these forms is greater in quantity than that which falls on equal surfaces of the latter. Thus by a wise and benevolent Providence, the water of the ocean is continually furnishing vapour, which is precipitated on the land for the support of vegetation and the supply of springs, and whose excess is poured back into the ocean in streams and rivers.

Water has been found by chemists to be a compound substance, made up of two elements. One of these, which forms 8-9ths of its weight, is the gas already mentioned under the name of oxygen; the other, a peculiar gas, known by the name of *hydrogen*.

Hydrogen, when free, is the lightest of all known bodies, rising and floating in atmospheric air; it not only combines with oxygen, to form water, but with carbon to form a great variety of compounds—gaseous, liquid, viscid, and solid. It also combines with nitrogen, and forms a gas known by the name of ammonia, which is well known by the peculiar smell it gives to spirits of hartshorn (*liquid ammonia.*)

Hydrogen also combines with sulphur, forming a gas known by the name of sulphuretted hydrogen; this exists in the atmosphere, but in such small quantities, as only to be detected by the nicest chemical tests. It combines in like manner with phosphorus, forming phosphuretted hydrogen gas, whose presence in the air is occasionally perceptible.

Oxygen, as we have seen, unites with carbon, to form a gas which we have called carbonic acid.

This receives the latter part of its name from its similiarity in properties to an extensive class of compound bodies, known by the name of *the acids*. The greater part of these, like carbonic acid, are combinations of inflammable bodies with oxygen. The most important of these in reference to our present object, are the sulphuric and phosphoric acids; named from the two substances (sulphur and phosphorus) which are their bases. Muriatic acid may also be mentioned here although its composition is of a different character. Oxygen unites with other bodies to form a class of compounds known under the name of oxides.

The acids unite with earths, alkalis, and metallic oxides, to form a class of compounds known under the general name of salts. These are named from the two substances which enter into their composition; thus, the salt formed of sulphuric acid and the earth lime, is called sulphate of lime.—The substances which unite with acids to form salts, are called the *bases* of the respective salts.

Of these bases, the alkalis, it is only necessary to know the names of two, namely, *potassa* and *soda*, and to be aware that their distinctive properties, are: to possess an acrid taste, a caustic operation to render oils capable of mixing with water, and to neutralize the properties of the acids.

The earth which the chemists call by the

name of silex or *silica*, is found almost pure in flint and rock chrystal; it is also almost pure in sharp colourless sands, and is by far the larger part of sands of every description. So far as the farmer need know its properties: it is hard rough to the touch, has no attraction for water, which it permits to filter through, or evaporate from it, with the greatest ease. It is capable of uniting with the other in compounds which are called silicates, and is the only earth which enters into the formation of soils uncombined with the others or with other elements.

The earth which chemists call by the name of *alumina*, is so named because it is obtained by them in a pure form from the well known salt called alum, of which it is the basis. Its most marked characteristic is plasticity; that is to say, it may be formed into a paste with water, will then easily receive any form which may be given it, and retain that form unaltered, even by violent heat. It never exists in soils unmixed, but in intimate association, or more probably chemical combination with silicia, it is the well-known substance called clay, or argillaceous earth. White clays are this combination nearly pure, and colored clays often contain it with no other addition than metallic coloring matter. Clay retains the plastic property of alumina; it therefore causes soils to be retentive of moisture; and when they dry, make them form tough clode or crusts, similar in character to sun-dried brick.

Soils which contain clay are often also mixed with sand, or with an excess of silicia in grains, which does not enter into the composition of the clay. Such a soil is less liable to form a tough crust than a pure clay, but it will require a very large proportion of sand to destroy this property altogether.

Clay mixed with sandy soils render them more retentive of moisture. Sand and clay have therefore been used as manures for each other; but it may reasonably be doubted whether all the advantage that has been anticipated by some from this process, can be realized, as such a mixture will be merely mechanical.

Loamy soils are generally said to be mixtures of sand and clay; they undoubtedly usually contain both these earths; and even sometimes a large excess of sand.—But we shall give reasons for believing that loams owe their peculiar value to a combination of clay with another substance, by which a change is produced in its chemical characters.

Lime is familiarly known by the same name that is generally used by chemists.—It is obtained by the aid of heat from rocks which go by the name of limestones.—These are combinations of lime with carbonic acid, which is fixed in them by chemical attraction, but which, when driven off by heat, takes the same form as the air of the atmosphere, or becomes a gas. This gas from this circumstance has been called *fixed air*, by which name it is often known when causing the sparkling and froth of cider and beer. The principal part of lime stone is therefore called by chemists *carbonate of lime*. Carbonate of lime is also found in shells, both those of living animals and those which exist in the ground in a fossil state. In the former it is mixed with animal matter which is more or less separated since the death of the shell fish.

Marl, in the sense in which the term is used by chemists, is a mixture of clay with carbonate of lime. The English writers on agriculture have not observed this distinction and the term is sometimes applied by them to a decomposed chalk, which may contain little or no clay: and sometimes to clay which contains no carbonate of lime. In fact, the name is frequently applied by them to any earthly matter found below the vegetable soil, which is capable of increasing its fertility. From this misapprehension, the substances which go by the name of marl in New-Jersey, Maryland, and Virginia, do not correspond with the chemical definition, but are generally beds of fo sil shells mixed in various proportions with earthy and saline matters of various kinds.

Lime is a substance very different in its characters from the two earths we have previously spoken. When prepared by heat from any of the original forms of its carbonate, it retains their shape unaltered, but may have its color changed, and always loses considerable in weight. It is now acrid, caustic and corrosive, and allkaline. Of these the most important is, that it unites with acids to form compounds included in the general class of salts. Of the salts of lime which are important to the farmer, the three principal are: the *carbonate*, which, as we havo stated, is found in lime-stone, chalk, and marl; the *sulphate*, in which lime is combined with sulphuric acid, and which in combination with water is the substance so well known to our farmers under the name of plaster of Paris, or less familiarly by that of gypsum; the *phosphate*, which constitutes a part of the bone of animals.

Lime, when exposed to the air, attracts carbonic acid, which is always to be found in the atmosphere; it thus passes back to the state of carbonate, but in so doing gradually falls to powder, and is then said to be *air-slaked*. If slaked with water, it also falls to a powder, which still retains the caustic character of the burnt lime; but this powder, when exposed to the air, unites with when carbonic acid more rapidly than in mass.

Lime, in its caustic state, has the property of rapidly decomposing vegetable and animal substances, thus hastening the natural processes by which they are finally destroyed; or, to speak more properly, have their elements resolved into new combinations. The offensive and unwholesome gases, which are given out by this composition, are absorbed by the lime, and probably by its other compounds; but in order that either this earth or its compounds shall manifest this property, they must be in small fragments, or, which is better, in fine powder.

Wet sand and plastic clay, and those soils io which they give their characters, also possess the property of absorbing gases; but they have this in a very inferior degree to lime and its compounds. As the gases generated by the decomposition of vegetable and animal substances form a large part of the necessary food of plants, it is obvious that a soil which contains the carbonate of lime, may retain and store them up for use, while they will be lost in soils of a different character.

Carbonate of lime may also be made a most important article in the preservation of the most valuable parts of putrescent manures, until they can be applied to the soil. In this way marl is applied to a great extent in China; the night soil of their numerous population is there formed into cakes like bricks, with marl, and thus loses its offensive smell; but when these applied as manure to the land, they give out the gases again as they are required for the nourishment of plants. So also in Norfolk, the site for dung-hills is prepared by a layer of marl, which is incorporated with the manure from time to time, and retains the gases which would otherwise be lost.

Lime may therefore be applied in its caustic form in some cases in agriculture, for it will hasten the decomposition of animal and vegetable matters which might be otherwise inert; it will also neutralize acids, which experienced farmers well know to exist in many soils, which they in consequence call sour. But the latter purpose will be answered as well by the carbonate of lime, which may be applied as it exists in marl or shells, or as it may be prepared by grinding limestone. Caustic lime is also dangerous in its application, for it will corrode and destroy living vegetables, and hasten the decomposition of the vegetable matter of the soil to such a degree as to injure its fertility. Except upon turf bogs, and land loaded with timber not wholly decomposed, quick or caustic lime ought not to be used; but to burn lime, and then by slaking to reduce it to the form of fine powder, which is speedily carbonated by exposure to the air, is a more ready, and generally a cheaper mode of obtaining the carbonate in a convenient form, than to grind limestone to powder in mills. Yet for many of the most valuable uses of lime in agriculture, the latter method, if as cheap, would answer as well.

Lime slowly combines with the earth silica, and produces a compound very different in character from either. It is this, to cite a fact in proof of our statement, which gives the sharpness and solidity to ancient mortar. The carbonate of lime will serve to form this compound: and thus, when it has time to act upon sand, it renders a silicious soil more retentive of moisture; while, if applied to clay, by combining with its silicious matter, it renders it more friable; and it is to the formation of this compound, by slow degrees, that we are inclined to ascribe the valuable mechanical properties of loamy soils, and the gradual amelioration produced by the use of lime, marl, and shells, as a manure.

Besides silica, alumina, and lime, an earth called magnesia is likewise found in some soils. It is also, in the form of carbonate, a frequent constituent of limestones. This

earth has many properties in common with lime; like lime it is capable of neutralizing acids; and when deprived of carbonic acid by heat, corrodes vegetable substances.—It probably also hastens putrefaction, and both it and its carbonate are capable of absorbing gases let loose in that natural process. It is, however, of little interest in agriculture, except as a part of some of the limestones which are used as a manure.—This, if applied in large quantities, are sometimes very injurious to vegetation; the reason of this is, that magnesia does not repass to the state of carbonate as rapidly as lime, and therefore contains its corrosive quality long after the lime has again become mild by its union with carbonic acid. In less quantities, however, the magnesian limestones may serve as a manure, but their application requires great caution, particularly when the quantity of magnesia amounts to twenty-five per cent.

All of the simple substances we have mentioned, except perhaps the last, either separate or in various states of combination, exist in plants. The manner and character of the combination is influenced by the vital action of the plant which causes them to form compounds, often in direct opposition to the manner in which the ordinary laws of chemistry would direct. It thus happens that so soon as the plant ceases to live, these chemical laws being no longer impended, begin to avert their influence; and if it be in such a state as will admit of the several elements acting readily upon each other, a decomposition, more or less rapid, of the vegetable structure ensues. It is a law of chemistry, that its action is always aided by the bodies being in a fluid state, and the action is often impossible when the bodies are perfectly free from moisture.—Hence the direct chemical action, and consequent decomposition, takes place with greater certainty and more rapidity in green juicy and succulent vegetables, than upon those which have been deprived of moisture either naturally or artificially. The grass, i heaped up in a recent state, decomposes, and if but partially dried, is heated, and may even take fire, by the chemical action of its elements; while, if dried by exposure to the sun and air, and then laid up in a dry place in the form of hay, it is almost indestructible. A moderate degree of heat and access to air is also necessary to promote the chemical action by which decomposition is effected. This decomposition is often attended with motion among the parts; and always, if the mass has a liquid form, as in the expressed juice of vegetables, or in the steeps employed by distillers and brewers, it goes in general terms by the name of fermentation. When the vegetable matter abounds in starch, the first change is the conversion of this principle into sugar. Sugar, if thus formed, is next converted into alcohol, as it is, if previously existed in the plant. The presence of alcohol gives the liquid in which it exists the charater of vinous liquors, and if these are permitted to remain in a turbid state, a farther fermentation converts them into vinegar; and finally vinegar is farther decomposed, and the vegetable matter, giving out an offensive smell, is said to putrify. If the substance be not an expressed juice or liquid steep, these several stages of fermentation ensue with rapidity, may be going on at the same time, and are sometimes so speedy in their course that no other action but the putrefactive fermentation can be detected. Animal bodies are subject to the same laws, and go through the same stages of fermentation, but the rapidity with which they run into putrefaction is even greater; still there are some cases, as in that of milk, where the vinous stage can be occasionally, and the acetic distinctly, observed.—Thus, a vinous liquor is prepared in some countries from milk, and the sour taste which appears in it when kept, arises from the presence of vinegar.

In the several stages of fermentation, parts of the vegetable assume the form of gas or vapor, and are given out to the air. The gases which have been detected, are carbonic acid, a gaseous compound of carbon and hydrogen, and in some instances ammonia. The vapor is that of water, which escapes in greater quantities than it would under ordinary circumstances, in consequence of the heat with which the process is attended. If exposed to rain, soluble salts with earthy and alkaline bases, are washed from the mass. Finally, a mass of earthy consistence alone remains, which, on examination is found to be made up of earths, insoluble salts, and carbon, being, in fact, identical with vegetable mould.

We may hence infer that the following elements exist in vegetable bodies:—

1. Oxygen, developed in the carbonic acid and water.
2. Hydrogen is in the water and carburets of hydrogen.
3. Carbon.
4. Earths.
5. Alkalis.
6. Nitrogen, occasionally developed in the form of ammonia.
7. Acids remaining in the insoluble, or washed away in in the soluble salts.

The chemical examination of vegetable bodies ought of course to lead to similar results. This examination has been conducted in 3 different ways.

1. With the view of discovering the nature of the compounds, called vegetable principles, which exist ready formed in plants.

2. For the purpose of discovering the chemical elements contained in these principles.

3. By the destructive action of heat, under which some of the elements are wholly separated, and others enter into new combinations.

In the first of these methods there have been detected:

I. Certain peculiar acids, of which we may cite

(1) Acetic acid, which, mixed with water, forms common vinegar.

(2) Citric acid, which is found in the lemon and orange.

(3) Malic acid, which exists in the apple.

(4) Tartaric acid, in the juice of the grape.

(5) Oxalic acid, in the wild sorrel.

From the Genesee Farmer.

BRIEF HINTS FOR SPRING WORK.—Apply manure to corn and potato crops, and not to grain crops.

Let manure be buried as soon as possible after spreading.

When rotted or fermented manure is applied, let it be as thoroughly mixed with the soil as possible.

Wheat thrown out of the ground by frost, should be pressed in again by passing a roller over it.

Ploughing heavy soils when wet, does more injury than if the team were standing idle.

In ploughing green sward deeply, the furrows must always be at least one half wider than deep, else the sods will not turn well.

New meadows should now be rolled.

All grain fields seeded to grass should be rolled.

Barley should be sown as early as possible, upon a light and moderately moist soil, at the rate of one and a half to two bushels per acre, according to the size of the seed.

A roller should be passed over it as soon as it is harrowed, to press the soil around it, and smooth the field.

Barley seed may be freed from intermixed oats by pouring water upon it, when the oats will float, and be skimmed off.

Oats require strong rich soil, good culture, and early sowing.

Preserved leached and unleached ashes which have accumulated during the winter, to be applied to corn in the hill.

To prevent corn being touched by crows, stir the seed with a sufficient quantity of heated tar, and then roll it in plaster, lime or ashes.

Plaster is always most efficacious on light and thin soil—on meadow and clover ground, the earlier it is sown the better.

Plaster when applied to cultivated ground, is best when worked into the soil.

Sowing it broadcast upon Indian corn after it is up, has increased the crop 25 per cent.

Every farmer should attempt the field culture of root crops—he may raise as much cattle food from one acre, as from five acres of meadow.

Farmers who have heavy rich soil, will succeed best with mangel wurtzel—those who have sandy soil, with ruta baga. They should try both.

Sow garden crops in drills where practicable, in order that the weeds may be cleared with a hoe.

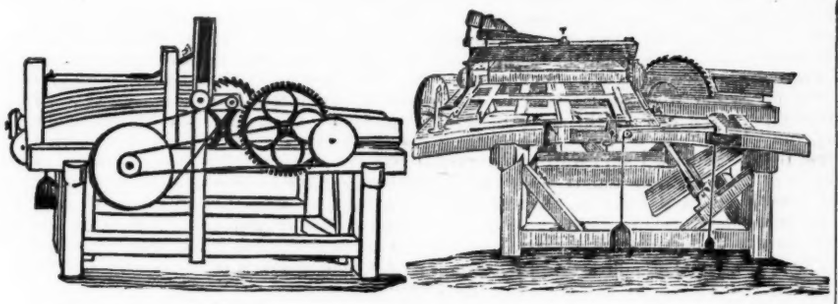
Different varieties of melons and squashes should be planted at the greatest possible distance, in order to prevent intermixing and crossing.

Loosen the soil with a spade round fruit trees growing in grass land.

Examine the roots of peach trees and remove all the grubs. Their presence is shown by the gum oozing out.

The last Albany Cultivator says—"Mr. Asa Carter, of Champion, Jefferson Co., has shown us a specimen of silk manufactured by his daughter, who never saw a silk worm, nor a silk reel, till last summer. This is a pretty good evidence that there is no great art or mystery in managing silk worms."

One pound of potash dissolved in two quarts of water and applied to trees, will effectually destroy the bark louse, &c.



CORNELL'S PATENT STAVE MACHINE.

Numerous inventions have at various times been patented to facilitate the making of staves for casks, barrels, &c., but few of which have proved successful. The one which is the subject of the present notice forms an exception. Competent judges give it a decided preference over any similar invention and are of opinion that it must eventually supersede the present economy of the branch of coopering which prepares the staves for the casks. This machine was invented by Philip Cornell a native of Vermont, but for many years a resident of Cayuga County, in this State, who died in 1834, soon after his invention was introduced to the notice of the public. At the last Fair of the American Institute this Machine was exhibited in operation and attracted great attention, and a gold medal was awarded as a premium to the proprietors by the Institute. The patent is now owned by a company in this city, who we understand offer for sale rights for making and using the machine on liberal terms. [Mr. Edwin Williams of this city, is Agent for the proprietors, office No. 180 Broadway.]

This machine is now in operation in several parts of the United States, and fully answers the expectations of the inventor and those who have purchased a right to use it. Like other labour saving machines which have been introduced into the mechanic arts, it has encountered the prejudices of many who are interested in the branch of industry to which it is applied, no doubt under the apprehension that it would lessen the demand for their labor. Experience will prove in this, as it has in other instances, that the apprehension is not well founded; that instead of lessening the demand for workmen, it will be increased, by the increased demand for the articles of which it produces but a part, requiring the hand of the workman to complete.

The sawing machine and the dresser, which together constitute a complete machine, will occupy a space of about ten feet square, and can be attached to an ordinary saw mill at an expense of geering not to exceed $50, and in most cases for a less sum. The power required to operate one machine, either steam, water, or wind, is equal to about seven horses. Two men will be required to a machine. An ordinary mill, with one saw, will supply timber for three machines. The timber is first sawed into plank 3¾ inches thick, and then cut to the length of the staves required.—Staves can be made from any kind of wood without regard to the grain. A machine will complete two thousand oak barrel staves per day, of ten working hours; these staves require assorting, and such as are unfit for tight casks, answer well for dry ones. The loss of stuff is very trifling. The cost of a machine for hogshead or pipe staves is $325, and for barrel staves $300, exclusive of the charge for patent right.

Extract from the Report of the Committee of the American Institute, adopted October 1, 1835.

"With dilligent attention and adequate power, one set of these machines, of which there are in effect three, two of them, the bevelling and smoothing machines being separate in their action, although constructed in one frame, and the machine for sawing out the staves being separate in another, it is highly probable that two men supplied with material at hand, could saw, bevel, and smooth *three thousand* barrel staves in a day of ten working hours.

"These machines are evidently great labor saving machines, and it is believed they are more perfect than any others designed for this manufacture. They possess the rare test of mechanical perfection, in being quite independent of great skill or cleverness in the operator. Any faithful, diligent, and industrious labourer, of ordinary intelligence, can work them with advantage.

"Your Committee recommend these machines as eminitely useful in the manufacture of staves, and anticipate that their perfection will suggest some corresponding improvement in the manufacture of barrel and pipe heads, yet much needed in this branch of the arts."

Copy of a letter from A. W. EDWARDS, *of Fulton, Oswego County, New-York, who had in use two of the Machines, and was waiting for the other.*

"I am in very great want of a dressing Machine. I have 30,000 staves already seasoned to dress, and plenty of contracts waiting to be supplied. I would not be without the Machine for ten dollars per day. I find no difficulty in cutting *ten staves* per minute, and I can very nearly average that from Oak timber, of which I use considerable.

From BROWN, LORD & Co. *of Bangor, Maine, who have had a Machine in operation one year.*

"In answer to your request respecting Philip Cornell's Stave Machine, we are happy to state, that it fully answers our expectations, and all concur in giving it their decided approbation after seeing it. As it respects the market for the staves, we have no difficulty in disposing of all the staves that we make, at about twice the market price of similar staves made in the usual way. BROWN, LORD & Co."

From the Washington (North Carolina) Whig, February 27, 1836.

"*Cornell's Stave Machine,*—The staves made by this Machine are, without exception the most beautiful and correctly jointed and dressed staves we ever beheld. A barrel made of Pine staves was exhibited full of *spirits of turpentine,* which had been filled about a week and remained perfectly tight. We were present when the same barrel had been filled with water before, and it was then perfectly tight also. There does not remain a doubt but that it (the machine) makes staves from any kind of wood, far superior to those dressed in the usual way. Barrels made of them need no flagging, and the staves must make a tight joint. The bilge or size of the barrel may be varied at pleasure, as well as the thickness or length of the stave."

Extract of a letter from Messrs TANNAHILL & LAVENDER, *Washington, N. C., May 25, 1836.*

"The sample of staves (made by Cornell's Machine,) sent by us to the West Indies, were very much approved, and contracts might have been made for cargoes."

From JOHN P. OBER & Co. *Elsworth, Maine.*

The subscribers have had in operation for three months, at Elsworth, Hancock County, Maine, one of Cornell's Patent Stave Machines, and find it to answer our expectations in every respect; we have finished twenty-eight staves, thirty-two inches long, of beach wood, in five minutes, and can average two thousand every day of ten working hours. We obtain for the staves for barrels of Beach, Birch and Ash, from twelve to fifteen dollars per thousand, (nett 1,000.) We have proved the barrels and casks made with the Machine, and find they will answer for liquor or dry casks, as well as those made from any other staves.

JOHN P. OBER & Co.

(One of this firm is a Practical Cooper.)

Those who wish to see the Machine in operation in this city may have an opportunity by calling at the office of the Mechanics Magazine and Railroad Journal, 132 Nassau street.

I witnessed at the capitol with great pleasure on Monday last, Mr. Smith Cram's (of the city of New-York) invention for overcoming an elevation in Railroad transportation of 440 feet to the mile. It was performed with expedition by a single stroke perpendicular engine, which in point of power suffers much in comparison with a double stroke Locomotive Engine.

His plan, as exhibted, puts at rest all doubt as to the practicability of ascending and descending hills from 450 to 600 feet to the mile, with certainty and security. As to the certainty of overcoming elevation and inclination, the cog-wheels and ratchets as arranged satisfactorily show. As to the security, it is to be found in the introduction of his hydrostatic cylinder attached to the car which is designed to check the train of cars in ascending should any accident befal the engine, and to regulate their velocity in descending, or check them altogether. The accuracy of the principle in both cases is perfectly clear, and promises to be of incalculable value in the present age of improvement; and I doubt not it will be generally adopted upon the score of economy as to time and money; but

above all in the preservation of human life, which his plan so effectually guarantees, in comparison with the present mode of overcoming a trifling elevation by stationary power, committing our lives to the hazard of a single rope.

FULTON.

STEAM COTTON MILL.—An extensive steam cotton manufactory is about to be established at Portsmouth, N. H. A committee, previovsly appointed to inquire into the feasibility of the undertaking, reported the following facts:—

The estimated cost of all the machinery for a mill of 10,000 spindles, including gearing, tools, hydraulic apparatus, two Steam Engines of 60 horse power each, and land and buildings, is $164,000; viz:—

Machinery complete, at $10 per spindle,	$100,000
Bobbins, pickers, shuttles, boxes,&c.,	3,000
Belting, main shafting, and drums,	12,000
Cloth room, Presses, and Counting Room,	4,000
Steam apparatus for heating Mill,	1,200
Forcing Pump and Fire Apparatus,	800
Painting, Clothing Cards and Starting Mill,	5,000
Repair Shop and tools,	2,000
Two 60 horse power Engines, Engine House and Boilers,	12,000
Estimated Cost of Land and Buildings,	24,000
Making the amount of fixed capital	$164,000

From actual experience, it is ascertained that the fuel and water to operate the Mill one year would cost about $4000. It is also estimated that a Mill of this capacity would turn off 9000 lbs. of cloth per week, at a profit of $700, or nearly $37,000 per year. This estimate of the profits of the establishment was made by a person having an extensive knowledge of the manufacturing business; but we think it is much less than what would be realized.

At Middlesbro', a few years ago an obsecure fishing village, now become a considerable sea-port town on the river Tees, below Stockton—on laying the foundation for an Exchange, it was stated, among other important facts connected with railways, that that the projectors of the Stockton and Darlington railroad, only ventured to anticipate, as the greatest possible exp rt of coal from the Tees, a quantity not exceeding 10,000 tons per annum;—this successful undertaking has not been ten years in ope ation, and yet, during the past year, between four and 500,000 tons of coals had been exported from that river.—[Sunderland Herald.]

From the Southern Agriculturist.

ON THE PRIDE OF INDIA TREE, AS AN ARTICLE FOR FENCING.

DEAR SIR,—At your request, I furnish you with my observations on the Pride of India Trees, as an article of fencing, in places where timber is scarce and of indifferent quality. I have, myself, been at some pains in cultivating this high valuable tree; and bringing it to that state of perfection, which I have heard it attains, in its native clime. The result of my experience is, that it may be made one of the most useful and profitable fencing and timber trees known to the southern plantation. Our country is becoming, every year, more thickly settled, and as cultivation is pushed on, the vast primeval forests which cover the land, must necessarily disappear before the woodman's axe. The consequence is, that in a few years we will begin to feel the want of the necessary wood and timber for our farming purposes, and see the utility of setting out plantations of the more valuable forest trees. Indeed, I am aware of the existence of this want of timber on some of our sea-islands, and fertile rice lands, and it is particularly to the planters of those sections that I address these remarks.

The best method of cultivating the Pride of India, that I have yet discovered, is the following. Run a plough in a straight furrow, and return, ploughing up another furrow to the one made, then take a hoe, and at the distance of eight feet, open a hole about one foot wide along the ridge, which fill with well rotted manure from the stable, or heap of compost, into which drop four or five berries. This should be done in March or April. Cover them lightly and attend the young plants as you would cotton, keeping down grass and weeds, and pulling up the weak and slender shoots, leaving but one of the most healthy and vigorous. Go over this twice in the course of three months, with a plough, turning over the furrow to the plants. The young trees will rapidly grow to the height of six or eight feet. During this time, you must occasionally strip off the leaves and lateral shoots, in order to train the stems to a certain length. Keep them merely straight twigs to which they will naturally tend, until the next spring, when you will direct them to grow as upright as possible, keeping down weeds and grass as in the year before. In this year they will attain the thickness of about twelve inches in circumference; and by the next spring the height of twelve or fifteen feet. The growth may, however, be improved by the use of the hoe and manuring They may now be permitted to put out lateral limbs, suffering the most vigorous to continue, and taking off the weak ones while young, with a pruning knife. This will preserve the quality and beauty of the timber, making it fit in fifteen years for all manner of furniture.

The value of the wood cannot be too highly appreciated. It may be sawed into boards from twelve to eighteen inches wide, fit for almost any purpose, or into wainscoting of the most beautiful shades. It is a light, sonorous wood, not apt to split, and capable of a very high polish. It is entirely divested of any resinous matter, and thereby fitted to receive the most beautiful varnishes. It possesses powerful vermifugous qualties, and thereby fitted for all furniture of the bed chamber, as no bugs or any other insect will infest it. The texture or quality of the wood may be improved by being grown on land of a clay bottom, but will grow well on the loosest sandy loam. It should be raised from the seed in the manner I have described. If transplanted, its tap-roots will never grow, and the quality of the wood is much impaired. Besides, it will be more apt to be blown down, being supported only by lateral roots, these taking their sole pabulum from the rich loam on the surface, and giving to the wood a soft spongy texture.

As an article for fence posts, I can safely recommend it as one of the cheapest and most durable. In this latter quality it approximates more nearly to cedar than any wood I know. It may be planted where the fence is intended to be run, and your rails may be nailed to the body of the tree. The superfluous branches will afford an excellent fire-wood.

The foilage of this tree affords a wholesome provender for cattle. Horses, cows, hogs, sheep, &c. will eat the leaves greedily. When dried and mixed with hay, I know of no better medicine for cattle of every kind. Such are the vermifugous qualities of the entire tree, that I never fail to give it to my animals every spring. A few leaves given to horses once or twice a week, will afford them a most beautiful coat of hair. A decoction of its root administered in small doses to children every morning for nine days, will effectually destroy worms in them.

A correspondent of yours has already testified as to the excellence of Pride of India leaves and berries as a manure; and also as a preventive to bugs. To his testimony, I can safely add my own. I have tried both experiments, and have experienced the most beneficial results.

With every wish for your success, Mr. Editor, I subscribe myself

COLBERT.

SOME HINTS ON THE IMPORTANCE OF IMPROVING COTTAGE GARDENS. BY AN OLD FLORIST.

In looking over the last number of your Magazine, I was much pleased with an article from your correspondent, Mr. R. Murray, respecting the neglected state of cottage gardens, or perhaps, more properly the gardens of people in moderate circumstances in life, in the immediate vicinity of Boston. This is an important subject for discussion, and one which requires to be handled by persons who are competent to suggest methods for improving them. I have observed, in travelling through the villages in this neighborhood, many places that lay entirely waste, or but very little improved, that might, by bestowing upon them a small portion of time and care, be made a great source of amusement, if not of profit, to the proprietor or occupant. This state of things is apt to strike the eye of persons unaccustomed to such, very unfavorably; and they oftentimes judge precipitately. It is very rare in Britain to see the gardens, even of the poorer cottagers, lie so neglected. A small, neat flower garden in front of the house, in which a few choice flowers are grown, and with the honeysuckle, jessamine, &c., climbing over the walls, and running up the sides and over the door, adds very much to the appearance of the premises, especially if the house is an indifferent one. I have frequently thought, when the subject has occurred to me, that this must in some measure be owing to the very long cold winters which are experienced in this climate, and which prevents gardening from being carried on here but a limited part of the year. Yet, however, I have found, that many plants which I should have expected that the cold winters would have killed, live through them with but little or no protection, and flourish as well as in England.

The horticultural and floral societies which abound throughout Britain, have tended greatly to encourage gardening among the people: numerous prizes are awarded to individuals who are not members, but who produce any thing worthy of exhibition. I have never attended a meeting, but what a part of the room has been set off for the productions of the cottagers; and at certain times, the secretary and two or three members visit all the gerdens with-

in several miles of the place where their meetings are holden; a report is drawn up of the state in which they find them, and a prize is awarded to the person who keeps his under the highest cultivation. By this means emulation is produced, and the neighbor of the person who has gained a prize, begins to devote his leisure hours to the garden, rather than idle them away in places of dissipation; his family also receive more of his company, and the money that would perhaps have been uselessly spent, is applied to some good purpose. I do not know of any thing that ever gave me more pleasure, in travelling through the country, than to see a man, in the cool of evening, cleaning and watering his little garden, with his children playing about him.

I am not aware whether all florists' flowers can be successfully cultivated here; more particularly the picotee, carnation, auricula, polyanthus and ranunculus. They all live through the winters in England without protection, though some persons possessing valuable collections generally give them some covering during a few days of severe weather which sometimes occurs. Whether such flowers can be grown with equal success here, I am not able to state, but undoubtedly many of your readers who are more acquainted with the subject than myself, will give their opinions respecting it. I have always been an admirer of the flower garden, and for many years spent my leisure hours in cultivating many choice kinds, although I never carried it to the extent that many of the "fancy" do. Those persons who have become so thoroughly carried away into the love of florists' flowers as to walk twenty or thirty miles in a hot day in July, to get a sight of a new carnation, and having been gratified with such a view, will almost sell their coats from their backs to obtain a plant, may be truly said to be enthusiasts in the highest degree; but to that class I did not belong; nor do I wish to see any person in this community become so deeply imbued with such a feeling; it would be carrying things too far, and would have an injurious rather than a good effect. But I think that if mechanics, and especially persons employed in manufactories, would spend their leisure hours in the garden, where they have one, and where one could be obtained, they would find it a place of innocent and healthful amusement, and of time well spent. There only wants to be a few examples set, and a stimulous will then be given; and I have no doubt but that florists' flowers of every kind could be produced, and made to take the place of the weeds your correspondent complains of. I feel unable to do that justice to the subject which it requires, and hope that there are many of your readers, who see its importance, and will not neglect to occasionally remind us of it; at a future time, I may state something upon the culture of some kinds of flowers as gathered from my own practice; but as I have now trespassed too much upon your room, to the exclusion of more useful matter, with my best wishes for the success of your Magazine, and a hope that you may be rewarded for your labors, I subscribe myself,

AN OLD FLORIST.

Boston, Feb., 1836.

THE NEW SAFETY CAB.

We extract the following clear and sensible exposition of the advantages of this new vehicle (the invention of Mr. Hansom the architect of the Birmingham Townhall, confessedly one of the finest architectural productions of modern times,) from the prospectus of a company which has been formed for promoting its introduction into the metropolis:—

"The very peculiar construction of this carriage secures advantages that men of science and of practical experience have long wished for, but which have never before been obtained. Instead of an axle going through from side to side of the carriage, Mr. Hansom uses a frame work so contrived, that, while fully able to sustain any shock to which it may be exposed, and admitting the use of wheels of any diameter, it allows the body to be placed at any distance, however small, from the ground.—By this contrivance, three most important objects are attained: namely—

"1st. *Absolute safety:* for the body is placed so low, and the frame work so arranged, as to render it impossible that the carriage should be upset in any direction whatever; nor can a kicking, a rearing, of a stumbling horse place the passengers in danger.

2. *Great relief to the horse in peculiar situations:* for the centre of gravity of the load being placed below the centre of the wheels, the injurious pressure on the horse, in ascending and descending hills with a 2-wheel carriage of the common construction, is avoided; for in descending, the pressure on his back is entirely removed; while in ascending, a small and advantageous addition is made to it.

3. "*Considerable reduction of draught in all circumstances:* for wheels of larger diameter than usual may be employed, not only without prejudice to the other advantages of the invention, but in promotion of them, and it is on all hands agreed, that very great saving of draught might be effect a by the use of large wheels, but for the hitherto supposed impossibility of reconciling them with the other necessary properties and conveniences of a carriage.

* * * * *

"The inconvenience and danger of the present cabs have been long, loudly and justly complained of. The new cab is perfectly and obviously safe, and effectually protects passengers from injury by a vicious or stumbling horse; it affords ingress and egress as safe and easy as those of a sedan-chair, and is smoother of motion than many of the best carriages of other kinds; it also combines the shelter and comfort of a close carriage, with the lightness of an open one, and the speed of the best of the present cabs, at the cost of perhaps one-third less labor to the horse, and with the entire avoidance of the injurious effect of common 2-wheel carriages on hilly roads.

* * * * * *

"In ascents and descents, any moderate degree of safety to the passenger, or of pressure on the horse, has been, hitherto, attainable only by the use of four wheels. Where four are used, they cannot be large: much power is thus lost—to say nothing of the additional friction—and two horses are needed. Absolute safety, and greater comfort to the passengers, and much greater ease to the animal, are now secured by two wheels, and those large ones. The additional horse is thus dispensed with, and posting may be done by one horse, on terms and with a convenience and rapidity yet unaccomplished. The conveyance of mails and despatches may be done by 2-horse carriages, with the like, or even greater, benefit.

"A carriage has recently been built, and is ready for public inspection and trial, which exemplifies the plan, and fully justifies the preceding observations. It has been subjected to severe trials, both intentionally and by accident; and by coming out of them without the slightest failure, has proved that its framework may be safely relied on in any emergency."

From the immense mass of testimony, collected by the Select Committee of the House of Commons on Accidents in Mines, we have selected the following article in relation to a novel and ingenious method of lighting, not only mines, but all places where actual exposure of flame to the atmosphere, might be productive of dangerous explosions or conflagrations.

We recollect a domestic application of this method, that was ingenious enough in its operation.

A gentleman had lost a knife of some value, at the bottom of a very deep well. By means of a large mirror, he reflected the sun's rays to the bottom of the well, and immediately discovered the position of the knife. A magnet, attached to a line, was let down upon it, and brought up the knife with it. We have not unfrequently used this method of illumination, when in search of some small article in an obscure corner of a dark closet.

MR. GOLDSWORTHY GURNEY'S SAFETY METHOD OF LIGHTING MINES.

(From the Minutes of Evidence taken before the Select Committee of the House of Commons on Accidents in Mines.)

Has it ever occurred to you to consider whether mines might be lit under such circumstances as to do away with the necessity of the moveable lamp?—The subject has been one which I have lately considered a good deal, in consequence of being engaged again in experiments of a similar kind to those of 1822; I have recently made a series of experiments for the Trinity House on artificial light; and the results of these experiments, and observations connected with them, induce me to believe it possible to light coal mines without taking flame at all into mines: In a few words, I will state, that I think it capable of being done by reflected light. In these experiments I found artificial light may be produced, so intense that when placed in the focus of a parabolical reflector, it will throw a distinct shadow at the distance of eleven miles. Now, as light is capable of being concentrated, reflected, and refracted in any angles, or in any direction, or in any quantities, I think it possible that such light may be reflected into mines, subdivided, and passed through the galleries, in sufficient quantities and intensity as to enable miners to work far better than by lamps of any description. The light itself, and the combustion to produce it, could be placed above the shaft, in the open air. If, however, from mechanical difficulties, such as obstructing parts in the way of its passage down the shaft, it is possible that the light might be placed in some safe part of the mine itself, where fire-damp is never found, and from thence be reflected and refracted through the various parts of the mine. I have made experiments with this view, and have found light capable of being reflected, in various directions, with simple and inexpensive reflectors; the first reflection requires a true parabolic reflector, but afterwards plain and

simple surfaces will do. Possibly, the whole mine and galleries may be all lit by a single light, if not very extensive; but if seven lights of the first order be placed in the focus of seven true 12 inch parabolas, and arranged within a circle of 3 feet diameter, which they may be, I firmly believe one of the longest mines might be most effectually lighted in every gallery. No one can judge of the power and management of this light who has not seen it, or possibly conceive its practicability to the subject before us. I need not go into explanation of the manner of doing it. The Committee will remember that, as the angle of reflection is always equal to the angle of incidence, we may throw the light in whatever direction we please; by this means we may turn it round a corner at right angles, or in any angles suited to the drifts the mine happens to be cut into. The practical difficulties connected with this plan chiefly, I conceive, are those arising from obstructions in the galleries: one, for instance, is the air-doors, which are necessarily used for ventilation; there is no difficulty, however, in such case in placing a piece of plate-glass in some particular part of the door, so as to admit the passage of the light through it, or a second light may be brought in an opposite direction; again, if the galleries are so low that there is not room for the light, coal wagons or miners, to pass together, it is possible so to widen them, or enlarge them, that there would be a sufficient space for a sufficient quantity of light to pass; it may be passed through very small openings by strong concentration, and afterwards diverged as may be necessary.

Would it not be attended with great expense?—No.

Less than the ordinary mode?—I am not prepared to say exactly, but I think it would not be more expensive than the present mode. In case the light is not required to be very great, I think a light of less intensity might be used, with advantage, that would be less expensive than the present oil-lamps. A very simple but powerful light, is about to be adopted by the Trinity Board for light-houses, which, by way of distinction, and in reference to the place where it was discovered, has been called the "Bude Light." This light produces an intensity 140 times that of the present Argand burner; this light, therefore, may be used where the ramifications of the mine, or greater extent, does not require the first order, namely, the lime light. In some cases, the light from the common Argand burner, placed in a parabolic reflector, may be sufficient, and in that case it certainly would be cheaper. I am of opinion, from the experiments and investigations made at the Trinity House, that the light from lime, and also the Bude Light, is less expensive than that of the ordinary light, taking quantity and intensity into account, which may be sub-divided to equal intensity with the first; the intensity of the one is 290 times greater than the other, and the intensity of the second 140; thus one is capable of giving the same quantity as 290 Argand burners, and the other as much as 140.

The term Bude Light has no application to the peculiar manner in which it is produced?—It is a term simply used to distinguish it.

From what is it derived?—It is produced by striking nacent carbon, evolved in the combustion of oil, resin, or similar bodies, with oxygen gas.

You have spoken of difficulties in the introduction of this new system of lighting in the mines of this country; apply your mind for a moment to the difficulties which might arise in the mines not having above two or three feet depth of seam?—I think such difficulties are to be overcome by inexpensive boring or widening to admit the light to pass; in such a drift a stream of light, highly concentrated, of six inches diameter, would be ample, and whether it passed by the side or the top of the gallery, it matters not. A large quantity of light, by simple means, might be concentrated in such case, and passed along such an opening, and afterwards diverged in larger galleries, if such was indispensable. These are points upon which I think the Committee will find other persons more capable of giving information on than myself.

Supposing a light is required to be in a straight line for a mile, there would be no difficulty in obtaining a sufficient light at the terminus?—The light at the distance of a mile would enable you to read the smallest print. If it is reflected two or three times in that distance through a circuitous passage, you would lose very little, if you use good reflectors made of speculum metal. The quantity of light lost by such reflection is very trifling.

The question related to the casting of light upon one object at the distance named?—So I have answered it; it is of little consequence whether it be straight a-head, or at the end of a curved or angular gallery.

In case that light is then to be divided into fifty different directions, so as to suit different galleries, what would be the consequence as regards the terminus?—The result would be, that the light would simply be reduced fifty times in quantity; it would be divided into fifty portions; it would then be still stronger than the strongest Argand burners; and I beg to be understood as meaning the Argand burner used on the tables of private families, not the little oil burner of the safety-lamp. I will make an observation here which may be important, namely, the stream of light may be sent through the various galleries, and when it arrives at the situation where the men are working, every man, with a little reflector or refractor, as may be determined on, may take that portion of light which may be intended for him, and no more, from the great stream, and thus limit him the quantity of light that he may abstract from the stream; which portion he may at pleasure direct wherever he pleases on the work before him; so that instead of a lamp, he would work with a little diverging reflector, or refractor, which he would carry in his pocket, perhaps of the size of half-a-crown.

Do you not think that the experiments of scientific men might be better made in the mines themselves, than they could be in their own laboratory?—Certainly; if a principle is established, it rests as a matter of mechanical detail, or of mechanical situation and position, to know whether it can or cannot be applied, practically, with advantage. Sir George Cayley informs me that he used the principle of reflection to throw daylight to some men who were working a deep well. It had a beautiful effect, and answered the purpose perfectly. His reflector was nothing more than a piece of tin plate. The daylight is not sufficiently intense; we cannot focus it so as to be passed through the galleries of mines.

In your opinion, would the experiment be better conducted by placing the light above the shaft, or at the bottom of the shaft?—It would depend on the depth and size of the shaft.

Assume 200 yards in depth?—In such case above; you get at the materials and apparatus for forming the light better; the distance of 200 yards has very little effect in diminishing the light; reflected light does not obey the same laws as radiated light; radiated light diminishes as the squares of the distances, but reflected light does not; this is contrary to received opinions, but I am satisfied it is correct, from the observations I have lately made.

You have not supposed any difficulties in the application of this light, beyond those already stated, which the Committee understand to be the interruptions occasioned by stoppings or trap-doors in the mines, or the extreme sub-division of the reflected light?—I have: there are others, but I think of minor importance, which can only be justly appreciated in practice.

The shafts of the mines are placed at right angles, that is, they are driven along, and they begin at the further end, and then work upwards; is there any difficulty in transmitting the light at right angles?—Not any difficulty whatever; you may transmit the light in any angle you please; it may first be thrown down a shaft, and then sent into any angle, upwards or downwards, or on one side or on another.

Suppose there be a space of two or three feet left on one side, or both sides, of the carriages conveying the minerals along the galleries, the light might be transmitted independently of the space occupied by the carriages?—Certainly.

Or through a similar space above the carriages?—Yes.

And you propose, to obviate the difficulty of passing through the trap-doors, that means in the mines, by the insertion of glass in those doors; what is the smallest size you would consider sufficient for that purpose?—It would depend upon the situation in which the door was placed in the mine; if in the first gallery, where you wanted the full stream or supply of light to pass, you would require twenty inches diameter; when doors occur further on, in the division of light, perhaps three or four inches in diameter would be sufficient.

Would that be sufficient to light a gallery at the distance beyond the door many hundred yards, if twelve feet wide?—Certainly. There is another valuable natural fact that I would mention here: the stream of light, as it passes through the air, is refracted by the atmosphere, and thrown in all directions several yards, with an intensity sufficient for practical purposes. My house at Bude has a long gallery in it; I passed a stream of reflected light through that gallery; every bed-room entering into the gallery was sufficiently illuminated in every part for a person to pick up a pin. The light in the bed-rooms was refracted light, from the reflected light passing through the gallery. I conceive that unless men are working at some distance from the stream of light through a gallery, a reflector would be scarcely necessary for them. Dust, floating in the atmosphere, reflects a good deal of light sideways.

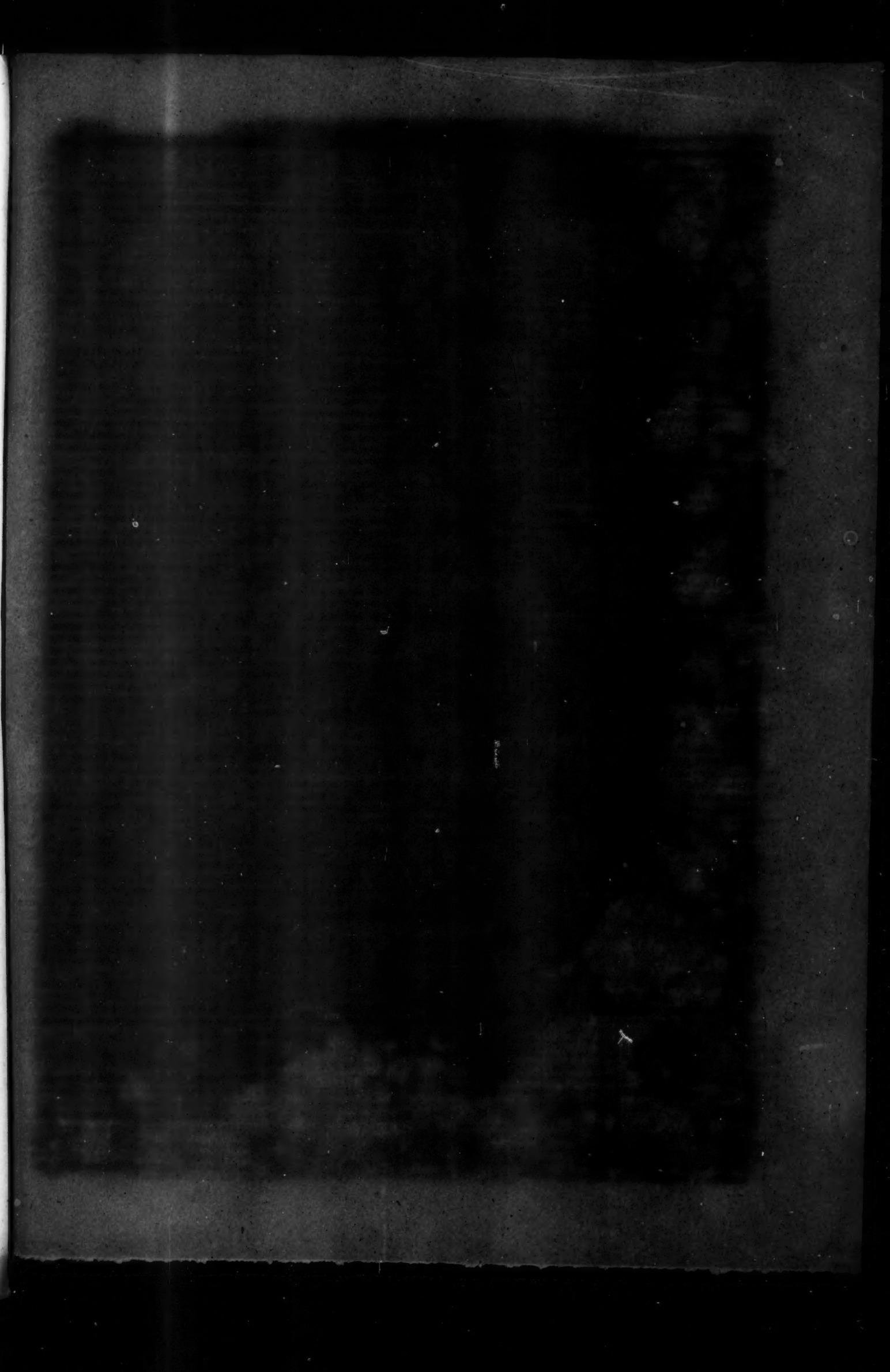
Would the accumulation of dust upon glass so inserted in one of the trap-doors, be a serious impediment to the light?—Not practically, because it could be easily wiped away.

Are you aware that a boy is generally stationed to take charge of those doors?—Yes.

And of course, he might have instructions to keep the glass perfectly clean?—Certainly.

WILLIAM ATKINSON, Rochester, New-York, Real Estate Broker, buys and sells on Commission, FARMS in the County of Monroe, and attends to the Collection of Mortgages.

Persons desirous of purchasing Farms in that fertile region, will do well to call on him. 6t*



☞ This number has been unavoidably delayed. *Perhaps* the next may be out before the end of July.

*** Bills will be sent in the next number to all who have not yet paid.

LIST NO. II.

[A.]

Andrews, Luther Pattens Mills, April 30, 1836.

[B.]

Brush, H. N. Moira, N. Y., Jan. 1, 1837.
Butler, T. B. Norwalk, Conn., Jan. 1, 1837.
Barker, Aaron Cleaveland, Ohio, Jan. 1, 1837.
Burrall, Lyman J. Elyria, Ohio, Jan. 1. 1837.
Briggs, W. M. Cortlandtown, N. Y., Jan. 1, 1837.
Bunting, Phineas Crosswicks, N. J., Jan. 1, 1837.
Blackstock, James Summerfield, N. Y., Jan. 1, 1837.
Brewster, Dr. B. Preston Hollow, N. Y., Jan. 1, 1837.
Brown, James Peekskill, N. Y., Jan. 1, 1837.
Bostwick, I. W. Lowville, N. Y., Jan. 1, 1837.
Bissell, F. Lockport, N. Y., Jan. 1, 1837.
Boisaibin, A. M. Morristown, N. J., Jan. 1, 1837.
Brown, Dr. N. Rochester, N. Y., Jan. 1, 1837.

[C.]

Case, Harlow Buffalo, N. Y., Jan. 1, 1837.
Case, Solomon Vernon, N. Y., Jan. 1, 1837.
Carpenter, Thomas Sa[illegible]itts, N. Y., Jan. 1, 1837.
Cruser, J. S. Princeton, N. J., Jan. 1, 1837.
Conkling, R. M. Cold Spring, L. I., Jan. 1, 1837.
Crane, Israel West Bloomfield, N. J., Jan. 1, 1837.
Capner, Hugh Flemington, N. J., July 1, 1837.
Cabel, J. Natchitoches, Louisa., May 1, 1837.
Collett, John Peekskill, N. Y., Jan. 1, 1837.

[D.]

Dunscomb, Edwd. Bemis Heights, N. Y., Jan. 1, 1837.
Downing, C. Newburgh, N. Y., Jan. 1, 1837.
Delavan, H. W. Ballston, N. Y., Jan. 1, 1837.
Dederer, N. A. Washingtonville, N. Y., Jan. 1837.
Dunham, S. C. Ellensville, N. Y., Jan. 1, 1837.

[F.]

Fell, John Coldenham, N. Y. June 1. 1836.

[G.]

Giddings, C. M Cleaveland, Ohio, Jan. 1, 1337.
Goodwin, James D. Livingston, Virga., Jan. 1, 1836.
Groat, Jeremiah Cranesville, N. Y. Jan. 1, 1837.
Garber, J. B. Columbus, Pa. Mar. 1, 1838.

[H.]

Hendrickson, Saml. Crosswicks, N. J., Jan. 1, 1837.
Hedge, Henry Chester, N. J., Mar. 1, 1836.
Hamilton, James Newark, N. J., Mar. 1, 1837.
Holbrook, C. Le Roy, N. Y., Jan. 1, 1837.
Hart, R. P. Troy, N. Y., Sept. 1. 1836.
Heart, A. P. Troy, N. Y., Jan. 1, 1837.
Hookes, James Poughkeepsie, N. Y., Jan. 1, 1837.
Hall, J. G. Metuchin, N. J., Jan. 1, 1837.
Hogan, D. M. Pittsburgh, Pa., Jan. 1, 1837.
Howard, Miller Crosswicks, N. J., Jan. 1, 1837.
Harris, Chas. Hudson, N. Y., Jan. 1, 1837.

[J.]

Jackson, M. Catskill, N. Y., Jan. 1, 1837.

[L.]

Livingston, Carroll Livingston, N. Y., Jan. 1, 1837.
Library, Flemington, N. J., Jan. 1, 1837.
Ludlow, Ditmas, Newtown L. I., Nov. 1, 1836.
Lefferts, L. Brooklyn, L. I., Jan. 1, 1837.
Legate, T. C. Galena, Ill., Jan. 1, 1837.
Lee, Henry R. Rahway, N. J., Jan. 1, 1837.
Ludlow, C. Newburgh, N. Y., Jan. 1, 1837.

[M.]

Mack, Andrew Detroit, Mich., Jan. 1, 1837.
Miller, C. B., Newburgh, N. Y., Jan. 1. 1837.
Mowry, L. R. Troy, N. Y., July 1, 1836.
Morris, E. Poughkeepsie, N. Y., Jan. 1. 1837.
Musser, H. K. Marietta, Pa., Jan. 1. 1837.
Morton, E. New Windsor, N. Y., Jan. 1, 1837.
Marvin, F. I., Catskills, N. Y., July 1, 1836.

[P.]

Parsons. Gorham, Boston, Mass., Jan. 1, 1837.

[R.]

Rait, John Bovina, N, Y., Jan. 1, 1837.
Roe, W. Newburgh, N. Y., Jan. 1, 1837.
Robinson, Sylvester 2 copies, Wakefield, R. I., Jan. 1, 1837.

[S.]

Southwick, Adam H. Warwasing, N. Y., Jan. 1, 1837.
Scott, Walter, Bovina, N. Y., Jan. 1, 1838.
Scott, Joseph G. Jerseyville, Ill., Jan. 1, 1837.
Sayre, James C. Louisville, Ky., Jan. 1, 1837,
Smith, E. H. Smithtown, L. I., Jan. 1, 1837.

[T.]

Taylor, Jacob Imleystown, N. J., Jan. 1, 1837.
Thompson, Sylvanus Pittsburgh, Pa., Jan. 1, 1836.
Tallman, M. M. Scipioville, N. Y., Jan. 1, 1837.
Thurston, W. T. Westerley, R. I., Jan. 1, 1837.
Thompson, Smith Poughkeepsie, N. Y., Jan. 1, 1837.

[V.]

Van Rensselaer, Gen. S. Albany N. Y., Jan. 1, 1837.

[W.]

Williams, & Son, T. W. Poughkeeksie, N. Y., Jan. 1, 1837.
Willson, W. H. Clermont, N. Y., Jan. 1, 1837.
Watterson, George Washington, D. C., Jan. 1, 1837.
Watson, Alexander Sing Sing, N. Y., Jan. 1, 1837.

[Y.]

Young Mens Association, Troy, N. Y., Jan. 1, 1837.

CITY LIST.

Bunting, J. P. Jan. 1, 1837.
Bates, Gilbert Mar. 1, 1837.
Barr, John Jan. 1, 1837.
Blackburn, John Jan. 1, 1837.
Faile, Thomas Jan. 1. 1837.
Horticultural Society, Jan. 1, 1837.
Munson, & Beach, Jan. 1, 1837.
Odell, Jonathan Jan. 1, 1837.
Oddie, W. M. Jan. 1, 1837.
Smith, John G. Jan. 1, 1837.
Tyack, W. Jan. 1, 1837.
Underhill, E. Jan. 1, 1837.
Vanderbilt, Jeremiah Jan. 1, 1837.
Warner, E. H. July 1, 1836.

CORRECTIONS OF LIST NO. I.—MARCH NO.

Bittell, J. F. Quincy, Ill. May 1, 1837, instead Jan. 1, 1837.
Collins, Thos. Burlington, N. J., Jan. 1, 1836, instead Jan. 1, 1837.
De Witt, G. G. N. Y. City, Jan. 1, 1837, instead Jan. 1, 1847.
Field, Samuel North Salem, N. Y., instead Northampton, Mass.
Fryer, Isaac N. Y. City, Jan. 1, 1837, instead Jan. 1, 1836.
Green, C. S. Lawrenceville, N. J., July 1, 1837, instead July 1, 1836.
Jackson, Bryan Wilmington, Del. May 1, 1837, instead Jan. 1, 1837.
Olden, C. S. Princeton, N. J., Jan. 1, 1836, instead Jan. 1, 1837.
Pendleton E. H. N. Y. City, Jan. 1, 1836, instead Jan. 1, 1837.
Wells, Horace Oxford, Ohio, Sept. 1, 1837, instead Jan. 1, 1837.